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Improved Patent Barrel Machinery.

The development of the petroleum interest has given an extraordinary impetus to the manufacture of barrels, and stimulated and directed invention to the improvement of machinery for rapidly turning out suitable vessels for the reception of the liquid wealth. Our vast commissariat operations also, rendered necessary by the war, added to this demand. In consequence of these events, large manufactories for the production of barrels and casks have been started all over the country, which, by means of improved machinery, have revolutionized the art of the cooper. The slow hand processes by which barrels were heretofore produced have given place to the rapid results of labor-saving machinery. The illustrations we herewith present show machines which exhibit much ingenuity and appear to be well adapted to the purposes designed. The engravings represent three machines, intended to do most of the work required in preparing stock for the manufacture of barrels. These machines are intended to finish completely both staves and head.

Fig. 1 is a perspective view of a machine for sawing staves to a uniform length, crozing their inner ends for the reception of the barrel head, and chamfering the end edges—all of which are performed at one operation. The shaft and pulleys, A, give motion to the counter shaft and pulleys, B, and these again to the feed pulley, C. They also drive the saw and cutter shaft by means of the belt, D. Two shafts, one on each side of the saw shaft, carry wheels, over which move chains, which have side projections, guiding them exactly in line through the longitudinal slots of the fixed bars, E. Vertical lugs are attached to the chains at equal distances, which give a horizontal motion to the staves as they are fed on the chains. As they come under the operation of the saws, F, and the chamfer cutters, G, with the V-shaped crozing cutters, they are held firmly by the adjustable plates, H, and the corresponding under plates, which bear upon springs, that allow, by yielding, for the varying thickness of the staves. The feed pulley, C, turns free on its shaft, and is connected or disconnected by means of a clutch, the handle shown at I.

Fig. 2 shows the stave-jointing machine. The top of the frame is concave, corresponding with the bilge of a cask, and on it travels longitudinally a carriage, A, gibbed to the frame slides, but moving freely. Secured to this carriage by pivots at each end, is a receiver, which holds the staves, placed edgewise, by means of the cam lever, B, operating on a spring, C. At D is a movable framed platform, pivoted to one side of the frame, and raised by means of the strap and treadle, E. The staves are placed, edge up, on this movable platform, when the carriage is over it, and clamped by the cam lever, B, into the carriage. At F, in the center of the machine, is a horizontal cutter head driven by a vertical shaft, which joints the staves, the bilge being given by the concavity of the slides, and the bevel by the position of the carriage which holds them.

A strap attached to this carriage winds on a roller, G, which, by its revolutions, draws the carriage with its load of staves regularly and gradually over the cutter head, F. A weight attached to the other end of the carriage draws it back when the jointing is performed, by means of the release of the roller, G, which is connected to the shaft on which it is placed by a clutch. This clutch is operated at this end by a latch on the carriage, and at the other end by the lever, H, through the intervention of a horizontal shaft inside the frame. Arrived at the other end, the receiver in the carriage, A, is reversed, so that the lever, B, is on the other side. The platform, D, being brought up by the treadle, E, levels the staves by their finished edges, and the operation is repeated, the staves when finished sliding to the floor on the guides, I.

Fig. 3 represents the heading machine, which saws and chamfer's the head at the same time. The cutters are a concave or dish saw, and a cutter head, secured on the same shaft. A is a U-shaped yoke, having a gear secured to a stud working in the lower half of the yoke. The back or top of this gear is a plane surface, and on it are placed the boards intended to form the barrel head. Directly over this secured loosely to the gear is a circular clamp screw, worked by the hand-wheel, B, so that the clamp will rotate with the gear, which is driven by the shaft and pinion, C. The yoke is pivoted to the

Fig. 1.

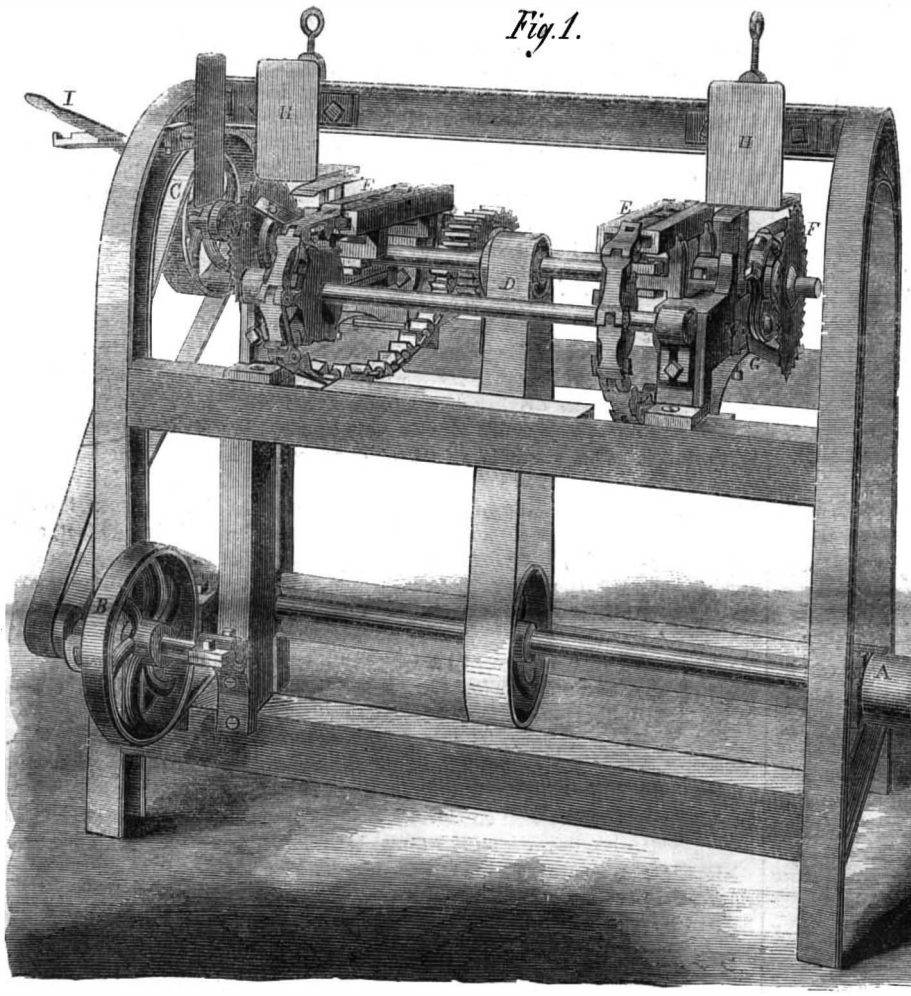
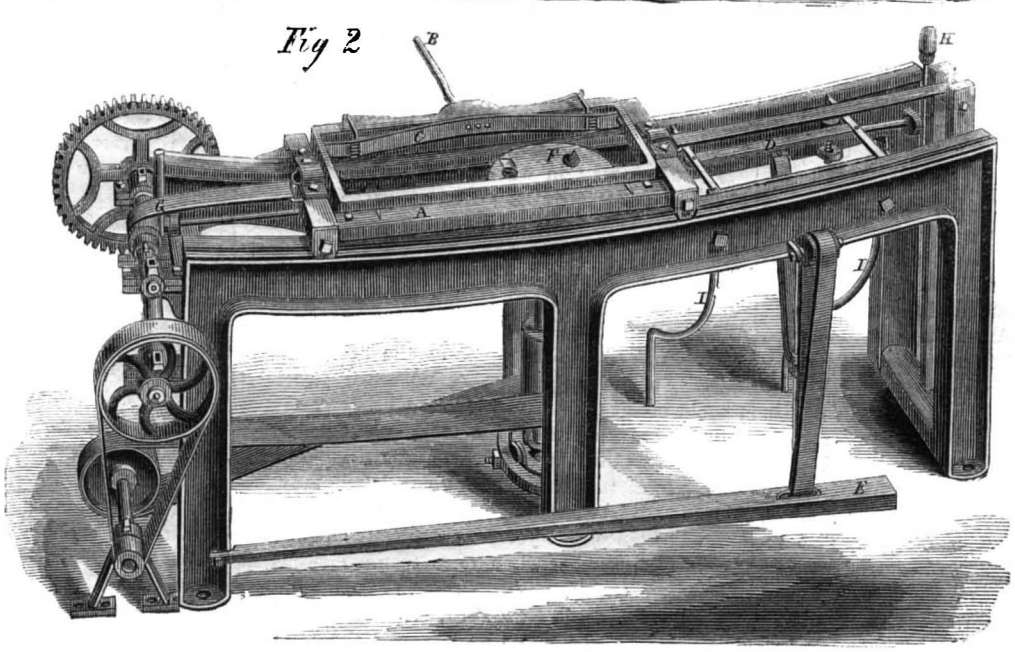


Fig 2



THOMPSON'S BARREL MACHINERY.

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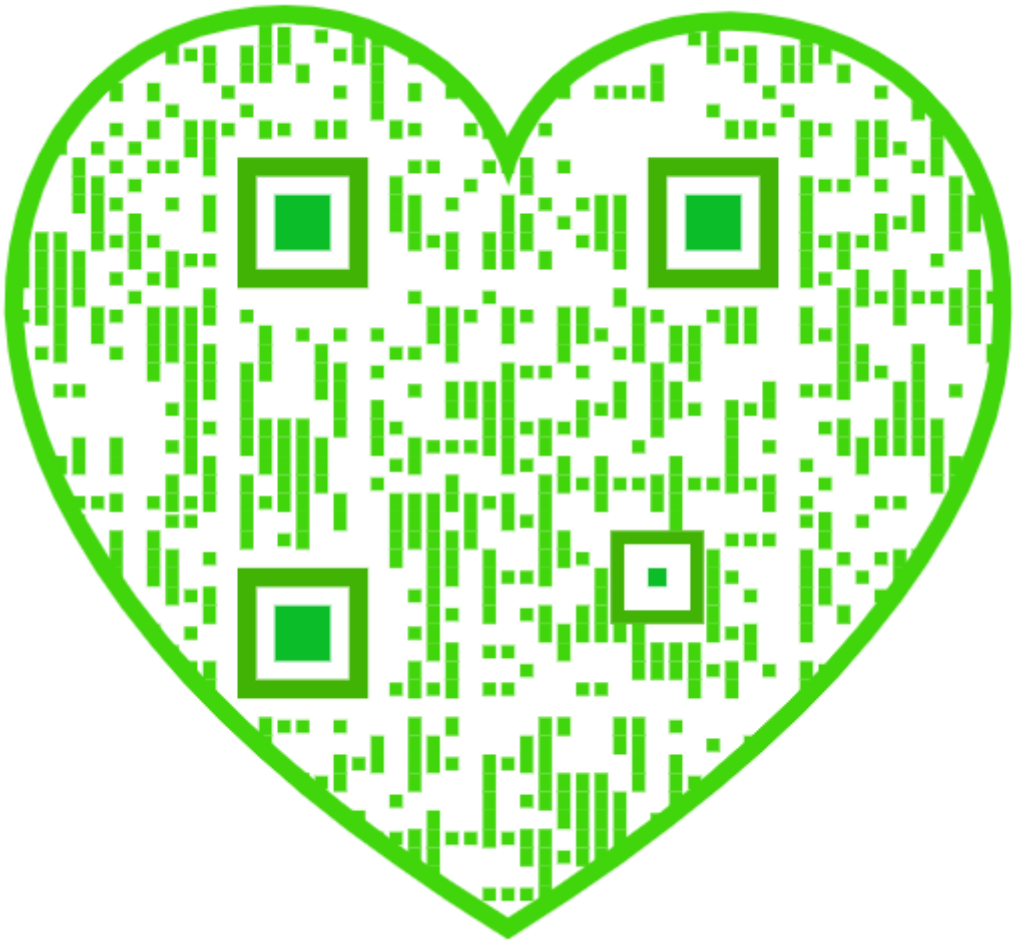
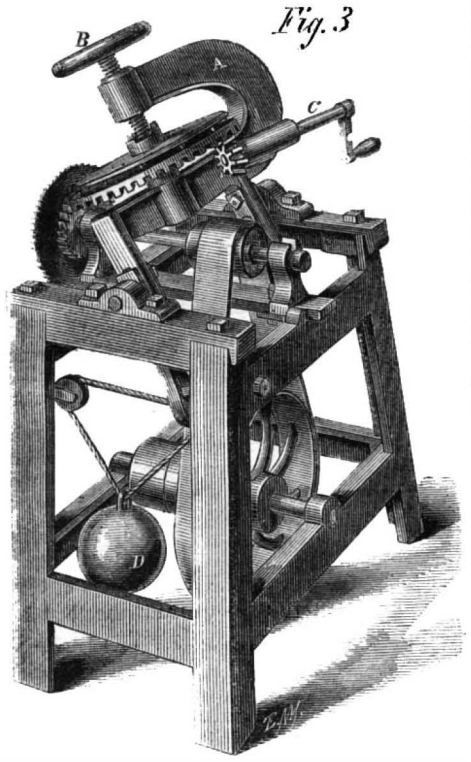


frame, allowing it to assume either an upright or inclined position. A weight, D, attached to the lower part of the yoke, brings it to an upright position when the pressure is removed. When the board, or boards, are secured between the clamps, the yoke is inclined to the saw and cutter, and the head rotated by the crank, C, or by power, the concave saw chamfering one edge and the cutter head the other. By means of adjusting bolts the saws can be moved

Fig. 3



laterally, and the yoke elevated or depressed to saw heads of any required diameter.

These machines were patented August 8, 1865. For additional facts address J. S. Thompson, Glen's Falls, N. Y.

[From our Foreign Correspondent.]

RAILWAY ENGINEERING IN LONDON.

LONDON, Oct. 16, 1866.

To the American engineer I think nothing can be more interesting as well as profitable than an opportunity of observing carefully the engineering works of this country. Owing to the greater amount of available capital, and the demands of her vast commerce, engineering is carried on in England on a scale that, as yet, is impossible with us. As an inevitable result of this we find the progress here, during the past few years, to have been much more rapid than in America, and works of which we are still debating the practicability, have been actually carried out, and their success placed beyond all doubt. There is, I really believe, more originality of a certain class in America, but after all "necessity is the mother of invention," and it is here where the demand for engineering is imperative that we find it most advanced. We Americans, then, may look at the condition of things here as a foreshadowing of what is to be in our country when the time comes for it.

As an example of this we may take the Bessemer process, without doubt the most wonderful invention of modern times, which is now just being introduced in America. When Mr. Bessemer, in 1856, first announced his invention, the excitement caused by it reached across the Atlantic. Soon, however, it became apparent that there were serious difficulties to be overcome before the process could be called a success, and as these appeared, the interest of the majority of our makers in the matter was very materially abated, and it began to be looked upon as one of those things which promise so well in theory, but are for practicable purposes useless. Mr. Bessemer, however, convinced by his first results that success was possible, discovered and removed, one by one, the adverse elements, till at last the process became as definite and uniform in its results as the old method of puddling, and indeed much more so. This once established, the wonderful increase of this manufacture that has followed, was a matter of course, and accordingly we find that the present manufacture of steel rails alone in Great Britain is at the rate of one thousand tuns per week, and on the Continent three or four hundred tuns. In addition to this there is a large quantity consumed for machinery, especially locomotives, the working parts of which are on some roads almost entirely of this material, owing to its strength, lightness, and uniformity. I shall have occasion to speak more in detail of this manufacture after visiting some of the works where it is carried on, as for instance, Messrs. John Brown & Co.'s, Sheffield, who have a pair of ten-tun converting vessels.

Another matter in which the English have decided the question of practicability for us is in reference to underground and overground railways. In a city of the size of London, some better means of getting about than omnibuses and cabs is an absolute necessity. Fortunately the crowded state of the streets would not admit of a resort to any such make-shift as horse cars, but instead of that, the real requirement has been met and the want fully supplied. It is singular what absurd stories are circulated in New York in reference to the underground railway, such as that the air in the tunnels is intolerable to breathe, and that passengers are taken out insensible, guards suffocated, etc., stories which I have reason to believe were in many instances put afloat by parties interested in the success of other schemes. When the road was first opened, several years ago, there was some slight trouble, but a very little experience long since removed all the difficulty. As soon as it became apparent that it would not do to discharge the gas from the furnaces of the locomotives into the tunnel, the engines were built so as to obviate the necessity of doing so. The boilers were made as large as possible so as to hold a large amount of water, the cylinders also large, being 18 inches diameter and two feet stroke, with driving wheels only five feet six inches diameter (a small size in this country). With these engines steam is raised at one end of the line in the open air to 130 lbs., and as soon as the locomotive enters the tunnel the exhaust is turned into a water tank instead of up chimney, so that the combustion is reduced to a merely trifling amount, and the steam is allowed to run down to about 65 lbs., the point of cut-off being varied so as to keep the power uniform. The road is 3¼ miles long, and the stations are at an average distance apart of ⅝ths. of a mile. The average speed of the trains is 25 miles per hour, stopping but about 50 seconds at each station. The three principal stations have glass roofs; and are far pleasanter and more commodious than any railway station in New York; the others are well enough lighted by large passages slanting down from the street above, lined with white tiles to reflect the light. The carriages, also, which are unusually commodious, are lighted by two gas burners in each compartment, which give ample light to read by if desired. In riding over the line myself, I could not discover anything at all unpleasant, and the best proof of the success of the undertaking is, that the number of passengers carried over the line last year was twenty millions, while the returns for the first six months of this year show a slight increase over that rate.

The other way in which the Londoners accomplish the object of getting from one part of the city to another, is by building a railway overhead. Not in any such way as we have had proposed in New York, to arch over Broadway and run a railroad directly over the street, but a viaduct of brick arches, say 30 feet high, is carried along behind the streets, and as much away from the best parts of the city as possible, spanning whatever streets it may be obliged to cross by an iron bridge, and terminating at stations at the most frequented parts of the city. On this, trains run every fifteen minutes for the local traffic. It is singular how many objections can be raised to these things when described from a distance, and yet how perfectly simple and feasible they appear when once seen. There is no city where such facilities of communication are so much needed as in New York, since its growth is necessarily all in one direction, and the majority of the people are obliged to go back and forth the length of it daily. Nevertheless, I suppose the proposition for a line of underground or overhead railway, down among some of the streets back of Broadway, would be at once met with a dozen unanswerable objections. Well, we shall see, five or ten years hence, how insurmountable the difficulties are.

The viaducts already mentioned are not built merely for the city traffic, but the majority of the principal lines of railway into the country are brought over them to stations in central portions of the city.

What would be thought in England of such an arrangement as that of the Harlem and New Haven Railroads for getting their passengers into town? Some of the viaducts are wide enough to carry six separate pairs of rails, and in some places even more. The railway stations in London and throughout the kingdom are well deserving of notice. They are invariably, and as a matter of course, roofed over, the roof being generally of glass, and in some cases of great size. The roof of the central station at Birmingham has, until lately, been the largest single span in the world, viz., from 180 feet at one end to 212 feet at the other, it being 800 feet long, but this is about to be exceeded by the one at St. Pancras station, in London, which will have a single span of 240 feet, the station being 700 feet long. One of the railways that has been opened within the past few years for local traffic, is a line from the South Eastern Railway Co.'s station, on Cannon street, to the London, Chatham, and Dover Railway Co.'s station, Charing Cross. Both these stations are new and very similar. I will therefore give you some description of the former, which may be taken as a fair example of terminal stations in this country. Standing on the sloping bank of the Thames, it was necessary to raise the building on arches in order to keep the proper level of the bridge, which starts directly at the station. The length of the building is 675 feet, and the width of outside walls 201 feet 8 inches; 75 feet of the length of the building is used for the booking offices, over which is a hotel, leaving 600 feet for the length of the main station. This is arched over by a roof of 190 feet 4½ in. clear span, the hight of the springing from the rails being 46 feet, and from the springing to top of rib 60 feet. About half of the roof is of glass. At the end of the station toward the river are two piers of ornamental stone work, and the clear distance between them is 153 feet 8 inches. The bottom of the girder resting on these piers and forming the end of the station, is 49 feet 6 inches above the level of the rails. The station contains five platforms and five "docks," for the trains, the platforms being raised about 3½ feet above the rails to bring them level with the floors of the carriages, and to keep people from crossing the tracks. This arrangement adds materially to the convenience of getting in and out of the carriages. One of the docks contains three pairs of rails, two two pairs, and two one pair. The platforms are all 12½ feet wide (of stone or brick work) with the exception of one of double the width. Between the two center platforms is a standing place for cabs, 20 feet wide, paved with wooden blocks. The cabs gain entrance by an inclined plane from the street below, and pass out in a line parallel with the length of the building on the level of the streets, at the end away from the river, which is also about the level of the station. There are gates across the ends of the platforms, at each of which an employé of the company stands to examine the tickets of passengers as they pass in, and thus prevent mistakes. The companies always have plenty of porters in uniform to direct passengers to the proper trains and assist them in getting in and out, and attend to their luggage. There is a clear space across the station between the entrances to the platforms and the offices, of about 40 feet, giving plenty of room for getting about, having baggage marked, etc. At one side are refreshment rooms and book stands. The walls of the station are of brick without windows. The front is of stone and highly ornamented. The Londoners are giving much more attention to making their buildings sightly than formerly. Starting immediately from the station, is the fine bridge over the Thames. It consists of five spans, the three center ones having a clear span of 135 feet 8 inches, and the two end ones 125 feet each. The total width, exclusive of foot ways, is 63 feet 6 inches, except at the span next to the station, where it widens out to 185 feet. The foot ways are 7 feet wide be-

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tween centers of inner and outer parapets, and are supported on cast-iron brackets on the sides of the main girders. The piers of the bridge are formed of cast-iron cylinders, sunk on an average 35 feet into the clay bed of the river. The diameter of the three lower rings, composing the cylinders, is 18 feet, the fourth tapers from 18 feet to 12 feet, which is the diameter the rest of the way to the top, the thickness being two inches. From a little below the low water line to the top, the cylinders are fluted; each pier consists of four of these cylinders placed 21 feet 2 inches from center to center. The three lower rings are filed with concrete, and the remainder of the cylinder with brick work up to 2 feet 6 inches from the bottom of the bed plate girders, which rest on granite blocks of that thickness and 11 feet diameter.

Two bed plates, 68 feet 6 inches long, 4 feet wide, 2 feet 3½ inches deep, and 6 feet 6 inches from center to center, rest on each pier. On these rest the thirteen floor beams, the two outer ones being of the box form, 8 feet 6 inches deep, and 3 feet 7 inches wide over all, and the eleven inner ones single web, 5 feet apart, and continuous over three spans, having a length of 442 feet 8 inches. They rest on cast-iron saddles on the bed plates of the two center piers, on rollers resting on cast-iron saddles on the two extreme piers, and on bed stones on the abutments. There is cross-bracing of T-iron from the top of one beam to the bottom of the next every 35 feet. It is only at the last span where the bridge widens out (there being sixteen beams here) that cross-girders are used. The flooring is of ½-inch iron plates riveted to the top flanges of the beams, thus adding immensely to the solidity of the structure. The plates are covered with asphalt, 2 inches thick in the center, tapering down to nothing at two gutters, which run the length of the bridge, at 16 feet, on each side of the center line, and discharge the water down pipes fixed to the piers. This protection is so complete that no water can reach the iron work. There are five lines of rails on the bridge, with a ballast of 3 inches of ashes under the sleepers and 5 or 6 inches between them. The distance from the Cannon street station to Charing Cross is about 2 miles. After crossing the river the road runs along on a brick viaduct, about on a level with the roofs of the houses, crossing the streets, if small, by arches of the viaduct, or otherwise by iron girders, of which there are eleven, and finally recrosses the Thames by the Hungerford bridge—another magnificent structure—and enters the Charing Cross station, a building, as I have said, very similar to the one already described. Trains run every fifteen minutes, taking something less than five minutes to make the run. The fare—first class, 6d, second 4d, third, 3d. The cost of such a railway will be seen from the description I have given of it to be very great, but when the wants of the community demand it, the outlay of capital is well warranted. This general sketch will give some idea of the state of railway engineering in England, and will serve as an introduction to other letters in which I hope to speak more in detail of railway machinery, carriages, and the construction of the permanent way.

SLADE.

MACHINE PRINTING OF CALICO.

In our issue of Sept. 22d, we published an article on the printing of woven fabrics, confining our remarks to the now almost obsolete method of printing by blocks—obsolete as regards calicoes. In the SCIENTIFIC AMERICAN of Nov. 10th, we described the process of engraving for the printing of calico by means of copper rollers and machinery. This was necessary to a proper understanding of this process of printing, which is to be the subject of the present article. Before giving a description, however, of the printing, we may allude briefly to other modifications of the engraving process, which we merely mentioned in our last article. In that we described the engraving of copper rollers by means of a steel "mill."

Sometimes it is found preferable to engrave the copper roller by hand without the intervention of "dies" and "mills." The pattern is transferred to the roller by means of varnish and lampblack, and the engraving is done, of course, by the "graver," a tool consisting of a steel blade perhaps one-fourth of an inch square by three or four inches long. One end is inserted into a short handle resembling a small drawer knob, which fits into the palm of the hand. These gravers are of differing forms at the point, some being brought to an edge like a chisel, some convex, and others having minute longitudinal scores on the under surface, so that the edge represents a logitudinal section of a saw. Similar tools are used by wood engravers in cutting "blocks" for pictures.

Another style of engraving was done, and is still much used, by means of a machine, carrying longitudinally along the roller's surface an arm having a diamond at the end. The roller is covered with a thin resistant to acid, which is dried hard. The roller, being mounted on a mandrel and laid horizontally in journal boxes, is made to revolve slightly as the diamond passes over the surface, leaving a diagonal or "slashed" scratch through the resistant varnish. The places to be left smooth, or unengraved, are determined by a pattern, which, by means of magnetism lifting the lever bearing the diamond just at the proper point, insures the preservation of the portion not to be engraved. The apparatus is too intricate to be described without engravings. When lined with the diamond, the surface of the roller presents the appearance of fine parallel, hair-like lines, running diagonally. There is a reason for this direction of the lines, as will be presently shown. Rotating the roller in acid, as mentioned in the last article, completes the engraving; the acid oxidizing the exposed surface until the requisite depth is obtained.

There is still another modification of machine engraving. This is the production of stripes, either longitudinal or transversely on the fabric. The first is effected by the use of a "mill" having a circumferential stripe, or stripes, which are engraved around the roller in rings. But the latter is effected by the use of a similar "mill," running longitudinally and diagonally along the roller. This is called the "slash" stripe, while the former is called the "Bengal" stripe. The "slash" stripe runs across the cloth.

All this is preliminary to the printing. The printing machine is an immense apparatus, weighing several tuns. It prints a number of colors, from one to twenty. We believe the largest in this country prints seventeen; but there is one in England capable of printing twenty. The usual number however, is from one to eight. The center of the machine carries a huge cast-iron drum covered with thick felting. The engraved copper rollers are disposed around this drum in suitable bearings, and their surfaces are in close contact with the central drum. Each one is supplied with a small auxiliary roller, that turns in a trough of the color intended, and delivers it to the printing roller. The superfluous color is scraped off the engraved roller by a thin blade of bronze or steel, called a "doctor," and falls back into the trough, leaving the color in the engraved depressions. Now it can be understood why the lines made by the diamond and the cross "slash" stripes, run spirally or diagonally. If they ran straight across, the edge of the thin "doctor" would spring into the stripes, scooping out the color and injuring the ground of the engraving. In patterns where broad stripes are used, or figures presenting a large surface, the bottom of the engraving is sometimes "stippled" or honeycombed with a sharp conical punch, to enable the depressions to retain sufficient color to saturate the cloth. The colors are stiffened, or thickened, with gum, so they will not spread or run one into the other. The cloth to be printed is passed, as the machine revolves, between the rollers and the central drum, receiving successively the colors as they are impressed upon it, then being carried off into a room heated by artificial means, for the purpose of drying and "setting" the colors. We have not room to describe the after processes of "livening" the colors, which is a combination of chemical and mechanical agencies.

The printing of calicoes by machinery is a delicate and careful work, requiring experience, judgment, and constant attention. The room must be kept at a certain temperature, the air must be sufficiently moist, and the exact adjustment of the rollers demands great skill.

The first roller, or that which gives the first impression, is a trifle smaller than the next, which, in turn, is smaller than the next, until there are four sizes. This is intended to compensate for the stretch of the cloth occasioned by the pressure to which it is subjected. Yet this necessary variation in size is very slight, amounting, even in the case of rollers six inches in diameter, to not more than a thirty-second of an inch, or possibly somewhat less than a sixteenth of an inch in the circumference. This is too small an amount to be measured by means of the callipers which gages only the diameter, and as the method of demonstrating this slight variation can be easily applied to nice work in the machine shop, we note it here.

The instrument is simply a copper wire flattened by being passed between rollers. When flattened it is about one-eighth of an inch wide. The ends are wound with rags and bent up to form convenient handles. One end is passed round the roller and drawn past the other, one handle in the right, and the other in the left hand. Where the wire meets it is scratched across, and then a scale as minute as may be desired can be made on one side of the gage to correspond with the single cross line on the other. By this means very minute variations in the diameter and circumference of cylindrical bodies may be determined.

MISCELLANEOUS SUMMARY.

SINCE the commencement of active operations on the Pacific Railroad, in August, 1865, the work has been pushed rapidly forward, and now 265 miles of the road are finished. It is expected that the road will strike the Rocky Mountains in one year. By Act of Congress, it is made incumbent upon the company to use American iron exclusively in the construction, and so far the greater portion has come from Pennsylvania. The work on the Pacific coast is being carried on with commendable speed, and from present prospects the entire line will be completed in the space of four years.

PROBABLY the largest flouring mill on the continent is now being erected in Newark, N. J., by Messrs. Fagin & Co. The mill will have twenty runs of flour stones beside the feed mills. The capacity will be 2,000 barrels per day. The engines employed are to be of 1,200 horse-power. The establishment will be complete in every respect.

DURING the eight months ending September 1st, one hundred and twenty-two vessels laden entirely with petroleum have cleared for foreign countries from the port of Philadelphia alone. For the year ending September 22, over 212,000,000 gallons were exported from the United States, an increase of two-thirds over the exports of the preceding year.

THE Revenue Commissioners estimate that over 42,000,000 gallons of distilled spirits, 186,000,000 gallons of fermented, and 10,000,000 gallons of imported liquors are annually consumed in this country, costing $500,000,000, and yielding a revenue of $47,727,276 annually.

UNDER the direction of Ex-President Murillo, of Colombia, several hundred miles of telegraph wires were projected, and now partially completed, across the lofty Andes; at one point the line will be elevated 13,000 feet above the sea level.

IT is now stated that by the end of the present month the Suez canal will be open for transit across the Isthmus, and the commercial houses are already announcing that they will receive goods destined for places along its route.

A RUSSIAN company at Helsingfors has obtained permisson from the Government to raise the ships sunk in the naval engagements on the 24th of August, 1789, and the 9th of July, 1790.

AN enormous plank from California was lately received in Washington, which measured twelve feet in length, seven feet four inches in width, and two inches thick.

DURING the month of October, 1,943,000 new copper five-cent pieces were coined at the Philadelphia Mint. The coinage of one-cent pieces reached 835,000 pieces, of twos, 357,000, and of threes, 164,000,

THE first agricultural and mechanical fair ever held in New Orleans is advertised for November 20th.

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Improved Double Power Wheel.

In this improvement we have a device for combining wheels driven by the force of running water, and also by the weight of the fluid, both acting in the same direction, and the latter using the water which has already given power to the former.

Fig. 1 shows the external appearance of the case of the wheel, and Fig. 2 the two motors with their gearing. The stream is received at A, Fig. 1, and, by the spiral form of the case, is forced to receive a rotary motion as in the common turbine. This water acts directly on the buckets, B, Fig. 2, which radiate from the center They are connected to a hollow shaft, which carries the large bevel gear, C, gearing into the pinion, D, on the horizontal shaft.

Passing through the inside of this main shaft is the shaft, E, to which the scroll wheel, F, is secured at the bottom, and a bevel gear, smaller than C, at the top. This gear meshes with the pinion, G, on the horizontal shaft. After the water, by its rotary force, has done its work on B, it falls and operates F, giving it twice the speed of B. By this combination it is claimed that this device has twice the power of an ordinary wheel with the same weight and force of water. It has been tested by a practical millwright with even greater reported results.

It was patented January 30, 1866 by L. D. Wynkoop, of Owasso, Mich., who will readily give any further particulars desired.

Fig. 1

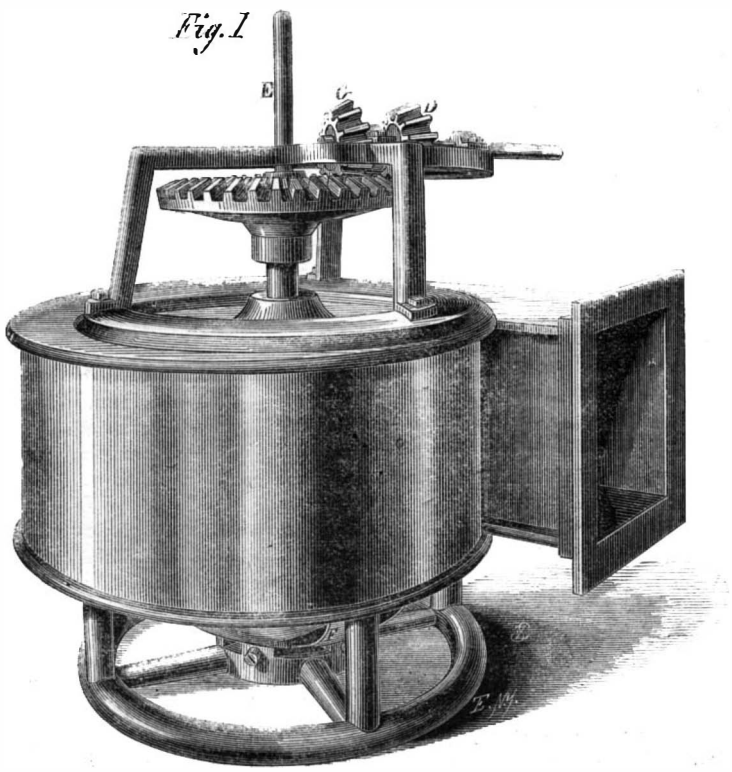
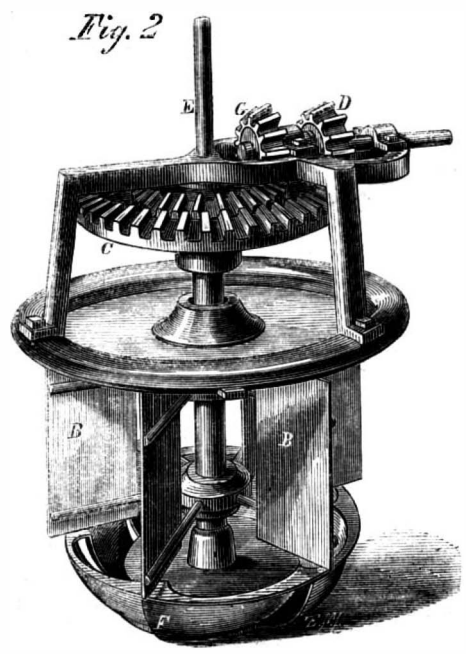


Fig. 2



WYNKOOP'S DOUBLE-POWER WHEEL.

THE MOST USEFUL OF TREES.

If trees took rank according to usefulness, the bamboo might fairly claim the crown of the vegetable kingdom. Tried by the test of utility to man, there is no plant the earth produces worthy to enter into competition with it. The Chinese say, and truly say, the bamboo is all profit. Seasoned with chillies, its tender young shoots make a favorite sambal of the Malay; sliced and boiled, they are served at the tables of the wealthiest Japanese; and when salted, dried, and prepared in vinegar, they make a pickle ever welcome to the Siamese gourmand. As the plant grows older, a fluid is secreted in its hollow joints which affords a refreshing beverage, and if it is allowed to remain untapped, the valuable medicine tabischeer—said to resist alike fire and acids—is produced. The leaves of the bamboo are reckoned a sovereign remedy for sore throat, as the bark is all-powerful against fever, and other useful medicaments are obtained from its buds and roots.

Entire houses are constructed out of the bamboo, the stouter parts of the tree supplying ready-turned pillars, while the slenderer joints are combined together to form the walls. Split into laths, and beaten out, it makes an excellent flooring; and for the roof, the canes are arranged side by side across the building, with their concave sides uppermost to catch the rain; the edges of these are covered with another row, with the convex side outward, and thus the roof is rendered perfectly water-tight. Should the householder be lucky enough to own the land surrounding his domicile, a bamboo palisade forms his best protection against intruders, whether quadruped or biped. Does he want to bring the waters of the neighboring river into his service for domestic purposes, in the hollow stems of the bamboo he has pipes ready to his hand; pipes easily converted into gutters and spouts, to get rid of the water he does not want. Then, inside this bamboo house will be found chairs to sit upon, benches to recline upon, mattresses to lie upon, pillows to rest the head upon, and mats to put the feet upon—all and each of the same material as the tube through which their owner inhales the fragrant weed at home, and the cane he leans upon, as he takes his walks abroad, with a bamboo basket on his arm, a bamboo hat upon his head, and possibly bamboo splints at his finger-ends to protect his long uncut nails.

The tea crops of the inland districts of China find their way to the seaports upon the shoulders of the coolies. Two strong bamboo canes are fastened to the sides of the load, their ends resting on the shoulders of the carriers. When the load is too much for four men, room is made for any additional number of bearers, by joining shorter bamboos to a cross-piece fixed to the ends of the longer canes. The palanquins of the mandarins are borne through the streets in a similar manner, just as sedan-chairs used to be carried through London thoroughfares in the days of our great-grandfathers. The bamboo is applied to transit purposes in many other ways. "The cany wagons light" of Milton are still used in Cathay; the Diak propels his light canoe by means of the bamboo; the river rafts of the Chinese are made of nothing else; and give a Hindoo boatbuilder three pennyworth of bamboo, and he will turn out a four-tun vessel, with mast and sails complete.

The Japanese separate the heads of their corn from the stalks by beating it over a bamboo grating, which, having a sharp edge, cuts off the grains at every stroke, leaving them to fall through the grating to the ground; or after being thrashed with a bamboo flail, the grain is sifted with a bamboo sieve.

When about to erect a house, the first proceeding on the part of a Chinese builder is the raising of a strong but light scaffolding of bamboo, and inside this the house is built up. When a building is to be pulled down, the bamboo is again called into requisition; the roof having been taken off, each of the end walls is attacked by a party of coolies, who fix their bamboos as high up the wall as possible, and push steadily together till it topples over with a loud crash and a smothering dust. This process is often performed at a fire in order to stay the progress of the destroyer. The Cantonese possess a fire engine, but for all that, still press the bamboo into service, the hose being held over the people's heads on long bamboos, and by their agency carried quickly to any desired spot. The watch-towers, too, from whence the police discern the whereabout of a fire as soon as it breaks out, are merely skeletons of bamboo. Lieutenant-Colonel Fisher bears witness to the ingenuity of the Chinese bamboo workers and the strength of their work when done.

When a verandah was required for an English mess room, it was some time before the bamboo worker could be made to comprehend exactly what was wanted. At last he was told to make "one piecey makey walkey topside, makey look see:" and the verandah soon proved that this extraordinary specimen of the English language was intelligible enough to him.

The Chinese man of letters writes with a bamboo pen upon paper of the same material; the musician extracts sounds sweet to Chinese ears from bamboo instruments, and the artist is indebted to the same source for his brushes.

Beside serving so many uses in commerce, industry and art, the bamboo performs its part in warlike operations, supplying lances, bows, and those wonderful grotesque shields with which the braves of the Celestial Empire seek to frighten their foes. The earliest attempt in the way of cannon on the part of the Chinese was a weapon of bamboo. In the war of '58, one of our Sepoy regiments was startled by a tremendous shower of rockets falling into their encampment at night, and killing a commissariat sheep. Next morning, a party was dispatched across the creek in search of the battery, and succeeded in capturing a number of novel machines, consisting of stout bamboos lashed together, which had evidently been used for the discharge of the rockets that had caused such commotion among the guardians of the government stores. The bamboo did good service on our side in the hands of the coolies acting as a land transport corps, and earned them the popular designation of the "Bamboo Rifles;" while on the other hand, its employment in the shape of stakes driven deep in the mud before the forts of Taku, cost England the lives of many brave men, and entailed an expensive campaign to obliterate the memory of an untimely disaster.

There are several species of bamboo, but according to Mr. Fortune the best and most beautiful is the Mow-chok, which is largely cultivated in the central and eastern provinces of China. The stems of this handsome tree are straight, smooth, and clear, attaining a hight of from sixty to eighty feet in a very short space of time, for it grows at the rate of two or two and a half feet in twenty-four hours. This useful giant has been introduced into India, and may, in time, supersede the inferior descriptions of bamboo, and give the Hindoo one more reason to venerate the name of Robert Fortune.—*Chambers' Journal*.

A CORRESPONDENT of the *Herald* states that Edmund Burke, of New Hampshire, and Judge Mason, of Iowa, are applicants for the office of Commissioner of Patents. Both these gentlemen have held the office, and it is possible that Mr. Burke may have a fancy to get back there once more, but we do not believe that Judge Mason would take it. If the President consults the wishes of inventors, he will not make any change.

ELECTRICITY is now employed in firing the charges of nitro-glycerin used in blasting at the Hoosac Tunnel.

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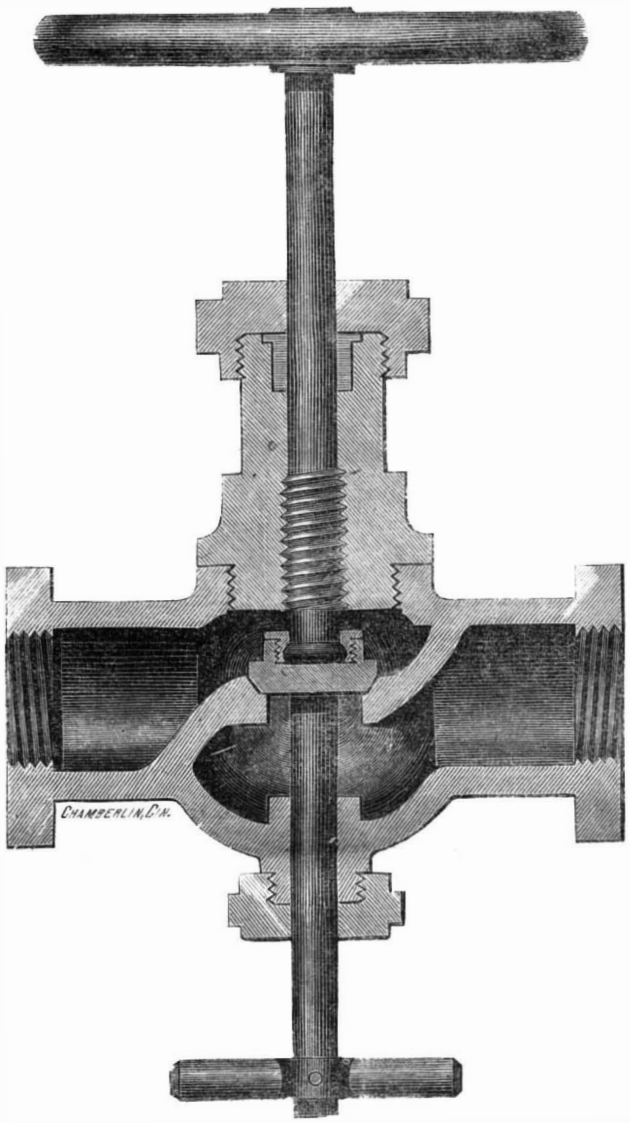
Improved Globe Valve.

Where the valve, itself, is rigidly secured to the stem, which always has a very fast thread, the operation of re-seating or grinding, is one attended with difficulty. The valve meets the seat always at one point, and if the two are not air-tight at that point, a leak is the unavoidable consequence. Still, valves must be re-ground at times, and the work should be done so that the valve and seat meet in line.

The engraving illustrates an improvement in globe valves, the advantages of which will be apparent to the practical mechanic at a glance. The valve is not rigidly fastened to the stem, but the stem, having a swell, a nut encompasses it, and while the stem and screw forces the valve to its seat, the valve can either turn or remain stationary. The valve is, however, fastened to another stem projecting through the opposite side of the globe working through a stuffing box. By means of a handle placed transversely across this stem, the valve can be turned or ground to its seat. This is an efficient device for removing scale or any extraneous matter that may lodge between the valve and its seat.

We think the improvement is a desirable one, and it will recommend itself to all engineers, as the valve can be rotated under pressure as well as when the pressure is removed. Manufacturers can make good terms with the patentee, who secured letters patent June 19, 1866. Address Joseph Worcester, Newport, Ky.



THE WORCESTER PATENT GLOBE VALVE.

Notes on Steam and the Steam Engine.

The nominal horse-power of a steam engine is found, by the Admiralty rule, by multiplying the square of the cylinder's diameter in inches by the velocity of the piston, and dividing the product by 6,000. The velocity of the piston is assumed to be, viz., for a 4-foot stroke, 196 feet per minute; 4½-foot stroke, 204 feet; 5-foot, 210 feet; 5½-foot, 216 feet; 6-foot, 222 feet; 6½-foot, 226 feet; 7-foot, 231 feet; 7½-foot, 236 feet, and at 8-foot stroke, 240 feet per minute.

The sixth clause of Watt's original specification of his steam engine reads as follows: "I intend in some cases to apply a degree of cold not capable of reducing the steam to water, but of contracting it considerably, so that the engines shall be worked by the alternate contraction and expansion of the steam."

Boulton and Watt's rule for estimating nominal horse-power was to multiply the area of the piston in square inches by an assumed pressure of 7 lbs. per square inches; this product by an assumed velocity of 128 feet of piston in feet per minute; this product again by the cube root of the length of the stroke in feet, and by then dividing the final product by 33,000. The cube root of the length of stroke in feet, multiplied by the square of the diameter of the cylinder in inches, and the product divided by sixty, gives an approximate result to the above, and was the rule commonly employed in the practice of the above firm.

Mr. Fothergill has mentioned a case where, in consequence of too highly superheating the steam employed to work a large factory engine, the condensed water from the engine became charged with rust to such an extent as to spoil a large quantity of goods, for washing which the water was saved.

Steam valves (of cast iron) have been ground to their seats and an excellent surface, resembling enamel, obtained by the use of oil alone, the valves being very heavily weighted and ground slowly for twenty-four hours.

In blowing off a steam boiler under a moderate pressure, after the water has escaped, the hand may be held without inconvenience in the dry steam which follows; when, however, the steam begins to come so slowly as to have time to condense upon the hand, the latent heat, not until then disengaged, will scald severely.

Steam is always fresh, and thus all the solid matter contained in the feed water, whether it be salt, chalk, or vegetable substance, is left in the boiler. With twenty grains of solid matter per gallon of water, the deposit in a boiler evaporating 2,000 gallons daily, would, in one year, amount to about one tun.

Steam generated from salt water is always more or less superheated at the moment of rising from the water. When generated from water of 2-33d saltness it is 2·5 deg. hotter than steam raised from fresh water, and when raised from water at 4-33d density it is 4·7 deg. above the temperature due to its pressure.

Steam was conveyed in pipes to a distance of over 800 feet to drive engines which were worked in the Great Exhibition.—*Engineering.*

A SYSTEM of telegraphing is now in operation in France, by which exact copies of the original messages are produced at the terminus of the lines, solely by mechanical means. The telegram is written on paper coated with a lead-colored non-conducting surface. The ink employed changes every point touched by it to the opposite electrical character. Two pendulums at either end of the circuit swing in unison; the upper end of each is divided into many points. By this contrivance, the message being passed over these at one end, a current to correspond with the writing is sent, and a fac-simile copy, on prepared paper held to the vibrating pendulum, is produced at the other extremity.

THE moisture deposited on the windows of the court room of one of our Western cities was collected and analyzed, when it was found to be putrefying and decolorized permanganate of potassa, more deleterious to health than that obtained from deep mines and similar places.

Correspondence

Inclosing Electricity.

MESSRS. EDITORS:—You are perfectly right in stating, page 261, that the report of an Austrian chemist having inclosed electricity in a glass capsule which explodes a projectile, is "fishy." It is nonsense. In the first place, electricity cannot be inclosed in capsules any more than heat can, and it would be just as credible to read the following nonsense: "that a Prussian chemist had succeeded in inclosing some white heat or red heat in a wooden bombshell lined with asbestos." Glass, called a non-conductor of electricity, is so only relatively; an absolute non-conductor exists as little for electricity as for heat; only a sealed glue bottle or tube will retain the electricity for some time longer than it will retain heat, but in the course of a few days it is always found to be gone. I verified this many years ago; having, by means of the blow-pipe melting the glass, sealed up Leyden jars after they were charged with electricity; in one week the charge had invariably disappeared; it passes entirely off through the mass of the glass, only it takes as many days as it would take the heat hours or minutes.

In the second place, electricity in a small capsule will do absolutely nothing when the capsule breaks; it is no explosive substance, and cannot possibly explode a steel case. This would require the stroke of a thunder cloud, or at least the accumulated power of the strongest electric machine ever made. Of course I mean the pure electricity without help of any fulminating powder. The whole report is evidently a hoax, only to be swallowed by people who understand nothing of electricity.

P. H. VANDER WEYDE, M. D.

Philadelphia, Oct. 1866.

A Green Meteor.

MESSRS. EDITORS:—Last night, at 8·25, while crossing from Barclay street to Hoboken, my attention was arrested when midway by a most brilliant emerald-colored meteor which seemed to leave the zenith, going in a south-westerly direction. When first seen it appeared stationary; it then commenced moving with a rapidly-increasing velocity. It appeared to be a large ball of emerald fire, very brilliant, and leaving behind it a radiating train of the same color. This train, after a few moments, broke into a perfect rain of emerald fragments. The meteor preserved its spherical form till apparently over Jersey City, when it burst, without noise, into a thousand pieces, all of the same color as the meteor itself.

There are several things connected with this meteor which struck me as being curious; its being stationary when first seen; the movement increasing in velocity; the brilliant emerald color, not only of the meteor itself, but also of the fragments; the brilliancy being but little impaired by clouds; for one of its size remarkable for bursting without a report.

A short time ago, when spending the night on the "Rochers du Noye," in Switzerland, at an elevation of 6,000 feet, I noticed two meteors, spherical, one red, the other violet, pursuing one another in what appeared to be the same path, bursting after a time with a loud noise. The peculiar state of the atmosphere last night might have tended to give the green hue observed. The duration of appearance was three minutes and a quarter.

ERNEST TURNER.

Hoboken, N. J., Oct. 22, 1866.

Use and Abuse of Nitro-Glycerin.

MESSRS. EDITORS:—Several months ago I applied to you for some information about nitro-glycerin, and was answered that it was an exceedingly dangerous and poisonous substance, and that I had better let it alone. Others, to whom I applied, wrote to pretty much the same effect. I attributed a great deal of this to the Aspinwall and San Francisco accidents, which had just occurred, and I think I was right in doing so, as I have since then used this substance almost daily without any mishap, and

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have, in addition, made it, under all sorts of circumstances, and, I was about to say, out of all sorts of materials. The foreign recipes I obtained were worthless, except as guides, because foreign acids differ in strength from ours, I presume. I feel certain that I came nearer blowing myself up trying to use Mr. Nobel's recipes, as published in *Dingel's Polyt. Journal*, than ever before or since.

In No. 13, current series, you publish an article from the *London Mining Journal*, which contains a process for making it which I had followed almost exactly. The amount of glycerin mentioned in that process is, however, still too large for our ordinary commercial acids. The nitro-glycerin rises to the top of the acid mixture, and I judge that that fact necessitates the diligent stirring. If not stirred the glycerin commences to decompose with nitrous fumes, creating heat enough to explode such nitro-glycerin as may be already formed. If an overcharge be put into a hole, it will throw rock out with great violence, but it does not search out a weak spot or seam, as powder always does. Hence the necessity of tamping powder, which the oil does not require, although in some situations it is an advantage to put tamping over the oil. It makes no perceptible smoke, and its products of combustion are innocuous, as far as I have perceived, in a close shaft. When I first commenced using it, the slightest contact with the skin would give me a violent headache, but it has ceased to affect me altogether by this time. C. L. Kalmbach.

Charlotte, N. C., Oct., 1866.

Interesting Boiler Experiments.

Messrs. Editors :—On Tuesday last, Oct. 30th, I was present at a series of experiments at the Harrison Boiler Works, in Philadelphia, before a committee of professional gentlemen from the Franklin Institute, and a company of invited guests; and considering the matter of much importance to the practical engineer and expert, as well as all persons who have occasion to employ steam power, particularly in a humanitarian as well as economic sense, I believe it should be made public first through the medium of the Scientific American.

The Harrison Boiler Works have been erected on an extensive scale by their proprieter, Joseph Harrison, Jr., Esq., for the special construction of the boiler or steam generator of his invention. Upward of two hundred of those boilers, varying from ten to one hundred and fifty horse-power, and of a maximum duty of over ten thousand horse-power, have been sold from these Works during the past year; all of them now in daily and most satisfactory use in various parts of the country, but chiefly in and near Philadelphia.

This boiler consists of a series of cast-iron hollow globes, each eight inches in diameter, provided with hollow unions or necks about three inches diameter and three inches long, having a reverse sectional curved outline to the curve of the globe. Some of the globes with their necks are cast singly, others are cast in a united series with transverse open necks, which, like those of the single globes, have the necks machine turned with rebate joints for fitting them together in sections or "slabs," usually twelve globes long and six wide, and representing six horse-power. The sections are placed side by side with lateral intervals or spaces equal to those between the sectional globes, and each pair is united at the top by a union neck to a transverse steam pipe, common to any number of sections; and at the bottom are similarly joined to a transverse feed pipe, the whole regardless of the number or power required; being for stationary purposes encased in brickwork which forms at the same time the boiler covering and the furnace walls.

The series of longitudinal globes are held together by bolts passing through them and confined from the outside by head and screw nuts. Transversely the lineal series are held by each alternate series, being cast with their necks united, hence it will be seen that as regards strength it is immaterial whether the boiler is designed for ten or one hundred horse-power, inasmuch as that the increase requires simply the addition of the proportionate number of sections; the larger being equally strong with the smaller generator, all the parts being equal in strength and duty. This construction of the generators or necked hollow globes admits of their being united in indefinite forms to suit circumstances of the shape or dimensions of the space in which they may be placed, and it is found that the system is equally adaptable to marine and to stationary purposes.

The experiments were made with sections taken from the prepared stock in the Works without any regard to choice or selection, and consisted of—

First, A section elevated upon one edge, raised to about 45 degs. was subjected to hydrostatic pressure, the injection being at the lower angle. The lower pair of globes were fractured at 600 pounds to the square inch.

Second, The injured globes being replaced by new ones the test was repeated, fracturing again at the same point under a pressure of 625 pounds.

Third, A section was set up in same positon in brickwork imbedded in a clay bank and covered with earth and timber for safety, and charged about three-fourths full of water, and sealed close. Fire was then applied, and steam raised to 852 pounds, when a sudden rushing of steam led us to suppose a rupture had occurred, but the steam gage rested at 300 pounds, when the fire was increased. Steam again escaping at intervals, and no rupture occurring, the fire was drawn and the section removed for inspection. It was found that the extreme heat had elongated the rod confining the lower series of globes, opening the joints and allowing the escape of steam and water; but on cooling, the rod had contracted and the joint seemed closed as at first, the nuts screwed up, and under 100 pounds pressure it was found perfectly tight.

Fourth, Two sections united and set in brickwork were charged three-fourths full of water and the furnace lighted, raising steam to 150 pounds, which was let off to 100 pounds, at which the pressure was continued, the fuel being increased and the valve open until from exhaustion of the water, the pressure went down to 30 pounds. The doors were then opened and all the globes above the bridge wall, about one-half the section, were found to be red hot—almost at white heat. No fracture or leakage or other injury could be discovered. It has hitherto been thought best to mount the sections on edge, with the front end elevated about 45 deg., the top of the bridge wall taking at a point about half the length of the section or "slab." By this system the heat being deflected forward by the bridge wall, rises and is then curved backward over the bridge, sweeping and enveloping the entire group of globes, thus presenting the greatest proportional amount of heat-absorbing surface that has yet been attained in any steam-generating apparatus. But to adapt the invention to marine uses, Mr. Harrison had fitted up a series upon a new plan, uniting them with ball and cup joint at top and bottom for safety and compensation. This formed trial—

Fifth. The furnace was lighted and steam raised from cold water to 30 pounds in 18 minutes, to 60 pounds in 22 minutes, to 100 pounds in 26 minutes, and to 150 pounds in 31 minutes, pine wood for fuel. The steam was run down to 100 pounds and the apparatus connected with the main engine actuated the works for the remainder of the day.

I doubt if any record of steam experiments has hitherto equaled the above, which will ere long be confirmed, more in detail, by the report of the distinguished official committee, in whose presence they were particularly made.

J. Burrows Hyde,
No. 8 Pine street.

New York, Nov. 2, 1866.

Repairing Cracked Circular Saws.

Messrs. Editors :—To mend a circular saw when cracked, first drill *at the end of the crack* a small hole one-tenth inch diameter, if the crack is more than three inches in length, then drill two holes two inches from the edge of the saw, and 1-10th inch from the crack, exactly opposite each other; then countersink the holes on both sides of the saw; cut through from one hole to the other with a thin file, the thickness of the file being less than the diameter of the holes; fit a piece of iron into a hole long enough to rivet on each side of the saw, filling the countersinks; then file even with the surface of the saw. A crack may be stopped in any kind of metal by drilling a hole at the end of the crack. The rivet proposed for the saw prevents the saw shearing or leaving a straight line. Square holes or dovetails would insure the saw cracking further, as the strain on the saw will start cracks in the angles of the openings. Wm. D. Rinehart.

West Manchester, Pa.

Correction of Errors in Transposition of Figures.

Messrs. Editors :—There is a curious fact in figures, known to the most of bookkeepers, that an error occasioned by a transposition of figures in posting is always divisible by 9. Thus, if the amount to be posted be 769, and it is copied 796, or in any of the six relative positions in which three figures can be placed, save the correct one, the difference between the true and false amounts is always divisible by 9. I have often heard the solution asked, and if you think it of sufficient interest, you may give the following :—

All figures have two powers—an actual or independent, and a relative one. The first is represented by its position, the unit column, and the second varied by the distance it is removed from that point, each additional remove increasing its value exactly nine, or a multiple of nine; and, as each of these changes is divisible by that number, the total amount must be so divisible.

C. C. Haskins.

New Albany, Ind., Oct., 1866.

The returns of shipping casualties reported in *Lloyd's List* for the six months ending June 30th, gives the number lost or injured as 5,455 vessels; 4,049 being ships, and 503 steamers. As to the nature of the accidents we learn that 67 vessels are missing; 186 have been abandoned, 40 being afterward recovered; 974 in collision, in which 92 were sunk; 259 sank from causes other than collision; 1,676 stranded, of which 893 got off, 512 did not get off, and the subsequent fate of 271 not reported; 31 were captured; 10 taken by pirates; 85 destroyed by fire; 120 dismasted or disabled; 591 leaky; 468 loss of anchor or chains; 106 machinery damaged; 193 mutiny and casualty to crew; 1,163 ships damaged, and 22 water-logged. The total number of lives reported lost was 1,400, but these returns are imperfect, and the actual number must be greatly in excess of the number given.

Snider, the inventor of the rifle that bears his name and the projector of the plan for converting the Enfield to a breech-loader, died on the 25th ult. His plan for converting the Enfield rifles had been adopted, and is now being carried out, by the British Government, but no compensation had been made to the distinguished mechanic, although his pecuniary circumstances and his bodily infirmities demanded it. It is a case of red-tape blundering and governmental ingratitude not very creditable to the English War Office.

The French method for preserving grapes the year round, is by picking the bunches just before they are thoroughly ripe, and dipping them in lime water having the consistency of thin cream. The lime coating keeps out the air and checks any tendency to decay. When grapes thus prepared are wanted for the table, they are placed for a moment in hot water, and the lime will be removed.

A Pill-box factory, in Brandon, Vt., owned by Newton & Thompson, uses two thousand cords of wood per annum, and employs sixty men, boys, and girls. The factory is run night and day a portion of the year. They have in use ten of Newton's self-operating pill-box and spool machines. They have been in operation about eight years. The factory is capable of turning out five hundred gross of boxes per day.

The Port Royal bridge, in the city of Paris, was macadamized in one night, recently, by means of a steam roller weighing 70,000 pounds.

Receipts.—When money is paid at the office for subscriptions, a receipt for it will always be given; but when subscribers remit their money by mail, they may consider the arrival of the first paper a *bona-fide* acknowledgment of the reception of their funds.

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Notes and Queries

G. B. S., of Pa.—The silicates of soda and potash have been known for more than a century. There were processes for producing them long before there were patent offices. The manufacture cannot therefore be a monopoly. There are, however, several valuable patented improvements in the processes of manufacture, the nature of which you may learn from the patent office records or from the inventors.

A. S., of Vt.—You are wrong in both of your suppositions concerning the rifle balls. A wind will vary the flight of a small ball more than a large one, for the reason that it presents a greater surface proportioned to its weight than the large one. The surfaces of the spheres are to each other as the squares of the diameters, while their solid contents are to each other as the cubes of the diameters. The range of the ball (the distance it will travel in a forward direction) is diminished by a side wind.

J. L., of Ky.—The size of the tubes in boilers does not affect their foaming. The cylinder and boiler connections have no effect on the foaming of the water. Leaky tubes can be easily re-riveted into the plates. Common bran of Indian or rye meal will often stop small leaks in boilers and will not injure any part. Iron packing rings are now generally considered as good as those of composition and Babbitt metal; at least they are generally used.

NEW INVENTIONS.

The following are some of the most prominent of the patents issued this week, with the names of the patentees :—

MACHINE FOR HANDLING LEATHER WHILE TANNING.—JOHN SNELL, JR., Potterville, Pa.—This invention has for its object to urnish an improved apparatus for handling hides while being tanned, in such a way that they may be kept constantly in motion through the tanning liquor, bringing all parts of the hides equally in contact with the said tanning liquid, so that they may be tanned evenly, in all their parts.

BROOM HEAD.—B. F. EARLY, Palmyra, Pa.—This invention relates to a means for securing the broom corn to the handle of a broom, whereby the tedious and laborious process of binding by cord, twine or wire is avoided, and a firm, durable and cheap connection of the broom corn and handle obtained.

TABLE.—PARDON BARRETT, Jackson, Pa.—This invention relates to an improved table, designed more especially for a sewing table for ladies, but capable of being used as a reading and center table. It consists in having the upper part of the table fitted on a vertical screw, in the upper part of the stand or support, so that by turning it may be adjusted higher or lower as desired.

WHEEL FOR VEHICLES.—D. J. KIRKMAN and E. H. GRAY, Winchester, Ill.—This invention has for its object to furnish an improved means by which open or unwelded tires may be tightened or strained, and the fellies lengthened or shortened as may be necessary for the proper attachment of the tire.

WATCH REGULATOR.—ALBERT HILL, New York City.—The object of this invention is to attain, by a very simple and inexpensive attachment to the regulating mechanism of a watch, a means by which the pointer or regulator may be adjusted with a much nicer degree of accuracy than hitherto, and which will admit of any one adjusting the regulator at any time without the aid of a magnifying glass and without exercising any special care.

JOINTING PLANE.—JOHN WOODVILLE, Cincinnati, Ohio.—This invention has for its object to furnish an improved jointing plane by means of which the edge of a board may be made square, or may be beveled at any desired angle.

FAN AND BEATER.—W. G. WILLCOX, Beetown, Wis.—This invention relates to a fan and beater for smut mills whereby the grain will be more thoroughly scoured than heretofore, and all impurities taken from it. It consists in having the wings or beaters constructed of concave form in their transverse section and fluted or corrugated longitudinally on their concave face sides whereby the desired end is obtained.

SPIKE MACHINE.—J. O. REILLEY (assignor to himself and ALEXANDER WILEY), Baltimore, Maryland.—This machine is capable of making ship and railroad spikes and boiler and other rivets. The levers which operate the head, bending, and the pointing die are thrown out of connection with their operating cams by bending their pivoted arms out of range, so that the machine may be adjusted for making hook-headed or plain spikes or rivets. The gage moves in the same plane as the moving die, and maintains its position until the header is about to advance. The cutter is advanced after the iron is clamped by the dies, so that it is not thrown out of position by the action of cutting. The adjustments which are made to suit the different kinds of work are effected with the greatest facility, and from practical test, the machine has been found to perform its several functions in a satisfactory manner, and the articles produced are of a superior quality.

RAILROAD-CAR REGISTER.—JOHN GSCHWIND and CHARLES GSCHWIND, New York City.—This invention relates to a new and improved register for street railroad cars and other public conveyances for the purpose of indicating the number of passengers carried during a trip, thereby serving as a check for dishonest conductors and employés.

BUSH HAMMER.—ALBERT WHEELER, Gloucester, Mass.—This invention has for its object to furnish an improved bush hammer for dressing granite, from which the cutters may be readily removed for sharpening or for replacing them with a greater or less number according to the fineness of the work to be done.

CUTTING AND BENDING HOOPS.—JACOB DOBBINS, Waterloo, Mich.—This invention consists in the combination of the straight knives with the feed rollers and spiral guides, for the purpose of cutting the hoops and bringing them into proper position to be acted upon by the bending device, and in the combination of a smooth, concave, metallic surface or guide with the roller, for the purpose of giving the proper shape to the hoops.

BROOM HEAD.—E. M. BAYNE, Uniontown, Pa.—This invention consists in forming the broom head with the lower edge of the conical cap placed outward and with a deep groove formed around the lower edge so as to present a rounded shoulder to the corn, and in brazing or otherwise securely attaching the nut the ferrule through which the screw passes and against which the lower end of the handle presses.

TOBACCO PRESS.—JAS. M. TALBOTT, Richmond, Va.—In carrying out this invention a series of retaining frames are arranged successively alongside of a track, upon which is mounted a truck bearing a hydraulic ram, which is mounted upon an independent spring truck. The ram truck is run from the carrying track into either of the retaining frames upon tracks, a pair of rails running from each retaining frame to the main track. As the axles or frame of the ram could not withstand the strain of the ram when in action, the springs are arranged so as to permit the solid body of the ram or its frame to come down against the ground or foundation, and the pressure is applied without injuring the bearings or frame. The retaining frames are so constructed as to adapt the follower to be freely moved by the ram, and then detained so as to hold the tobacco in its compressed state so long as may be desired.

FOOT WARMER.—CHARLES R. EVERSON, Palmyra, N. Y.—This invention has for its object the furnishing of a convenient apparatus for heating foot stools, foot stoves, flatirons, etc, and it consists in combining a kerosene lamp having a metallic chimney with a horizontal tube.

PUMP.—ALBERT CONANT and ISRAEL F. BROWN, New London, Conn.—This improvement in pumps is intended to simplify the construction both of the barrel or cylinder and its valve, at the same time improving the working of the valve, making it accessible and easy to be cleared from obstructions, and also rendering its removal easy of accomplishment without the use of tools, since it need only be lifted out of the cylinder, there being no fastenings to hold it on its seat.

CHEESE PRESS.—WILLIAM H. STEVENS, Winona, Minn.—This invention has for its object to furnish a cheese press convenient, durable, not liable to get out of order, and especially adapted for use in cheese factories or where large numbers of cheeses are made.

WOOD-SAWING MACHINE.—HENRY A. DANIELS, Thomaston, Conn.—This invention relates to a cross-cut sawing machine, designed more especially for sawing sticks into short lengths for fuel.

EXTENSION TABLE.—JOHN B. CURTIS, Port Henry, N. Y.—This invention relates to an improvement in extension tables, and consists in arranging extension leaves in sets, which are folded together within the frame of the table, so that they shall lie under and over each other when the table is closed, and are unfolded when the table is opened, the extension leaves being thus connected with the table instead of being separate, as usual, and therefore more compact and convenient.

STANDARD AND SOCKET FOR TRUCK CARS.—WILLIAM F. ALTFATHER, Johnstown, Pa.—This invention relates to an improvement in the stakes or standards and sockets used upon truck cars, or cars employed for freighting lumber, bark, and other bulky material, commonly carried upon platform or truck cars.

VALVE MOTION.—W. P. COREY, Amsterdam, N. Y.—This invention consists in the arrangement of a single eccentric, in combination with an oscillating link and block which connects by a suitable rod with the rock shaft and slide valve of a steam-engine, in such a manner that a correct and accurate working of the valve can be effected with only one eccentric for each cylinder, and the engine can be reversed with ease and facility.

CURING HEMP, FLAX, ETC.—WM. D. MONK, Williamsburgh, N. Y.—The object of this invention is to remove from the fibers of hemp, flax, and other similar plants, all gum and glutinous matter adhering to the same, and to bring said fibers in such a state that they are fit for spinning without requiring any further preparation.

WEATHER STRIP.—JOSEPH A. VINCENT, Fairbury, Ill.—The object of this invention is to produce a waterproof threshhold for dwellings and other structures, and also to prevent water from running in or being blown into a room beneath windows.

CROQUET BOARD.—JACOB FEDERHEN, Boston, Mass.—This invention relates to the cushions of croquet boards, and it consists in forming such cushion of a string or strings of catgut.

FASTENING FOR DOORS, ETC.—WM. H. FOWLER, Newburgh, N. Y.—This invention consists in inserting within the floor a peculiarly constructed and arranged fastening, by means of which, as the door is swung open, it is so operated as to prevent its closing until released or disengaged therefrom.

COMPOSITION FOR PAVEMENT.—JOHN HARTLIEB, Reading, Pa.—This invention relates to a compound which is made of coal tar, asphaltum, sharp sand, hammer stroke scales or flakes, turpentine, and common gravel, and which is intended as a pavement for garden-walks, sidewalks of streets, and other similar purposes.

STEAM BOILER.—THOMAS MAIN, Greenpoint, N. Y.—This invention consists in so constructing and arranging the parts of a steam boiler, that the advantages of a locomotive furnace and an upright tubular boiler shall be combined, and also in the manner in which the steam is taken from the steam chamber in a superheated state.

BEE HOUSE.—J. H. STARR, Middleburg, N. Y.—This invention consists of a close shed or house, having an open bottom, in which bases for the hives to rest upon are placed. The bases are slotted both at their sides and bottoms for the admission of air, and having bee entrances at their front ends. The shed or house is also provided with removable or detachable sides, so arranged that they may be readily applied to or detached from the structure, as occasion may require.

WEED AND GRASS COVERING ATTACHMENT.—M. T. SMITH, Keeler, Mich.—This invention relates to an attachment for plows, and has for its object the complete covering of all grasses and weeds in the plowing of land. It consists in applying a roller of concave taper form to an arm which is attached to the plow beam, whereby the desired end is attained.

STEAM PUMP.—JOHN JORDAN, Wyandotte, Kansas.—This invention relates to a low-pressure steam pump, especially adapted for use upon railways, and consists in a novel construction of the same, whereby many important advantages are secured.

FENCE.—CHARLES C. MATHER, Burlington, N. Y.—The object of this invention is to obtain a fence which may be constructed in an exceedingly economical and durable manner by any one of ordinary ability, and without the necessity of nailing the slats to the posts, which admits of new posts being inserted at any time without taking the panels apart or disturbing the slats or pickets

PRESERVING FRUITS, VEGETABLES, ETC.—E. G. HOLDEN, Covington, Ky.—This invention is designed to furnish a simple and effective method of preserving fruits, vegetables, and other perishable articles which are subject to rapid decay when exposed to irregular temperatures above and below freezing point, or to a moist atmosphere, by the application of ammoniacal gas for maintaining an even temperature in the chambers of the preserving house.

CHURN.—W. D. MATTHEWS, Columbia, Tenn.—This invention consists of a dasher composed of rotary beaters, arranged and operated in such a manner that a very simple, efficient, and economical churn is obtained, and one which admits of the dasher being readily removed from the cream receptacle after the butter has been produced, in order that the butter may be gathered and taken from the cream receptacle with the greatest facility.

ADJUSTABLE BACK FOR STOOLS.—THOMAS J. ROSS, Union, N. Y.—This invention consists in the arrangement of swivel brackets under the seat of a stool, in combination with a back which is provided with suitable arms, the ends of which can be made to catch in corresponding sockets in the brackets, so that when they are turned out the back can be readily connected to the seat, and if the stool is to be used without a back, the swivel brackets can be readily turned under the seat. The back is hinged to a vertically-adjustable frame, and applied in combination with two set screws, in such a manner that its position can be regulated to suit the person occupying the seat.

INHALER.—D. M. GOODWILLIE, New York City.—This invention consists in the arrangement of a four-way cock, provided with a valve which opens outward in its open end, and with another valve which opens inward on one of the passages, in combination with a suitable cup and shank, in such a manner that by means of said shank the inhaler can be conveniently secured to the reservoir or bag containing the gas, and by the cup the patient is enabled to apply said inhaler conveniently to his face; and furthermore, by the two valves the air which is inhaled is prevented from passing into the gas reservoir, and by turning the stop-cock the cup can be readily brought in communication with the open atmosphere.

GAITER BOOT.—R. B. JACOBS, Quincy, Ill.—This invention consists in so constructing a gaiter boot that it will be water-tight to the top, and without the use of elastics

BREECH-LOADING FIRE-ARM.—E. P. STODDARD (administrator of Charles C. Coleman, deceased), Worcester, Mass.—This invention consists in the arrangement of a pusher or other equivalent device, in combination with the frame of the fire-arm, and with the swinging breech block and hammer, in such a manner that in closing the breech block the hammer is automatically thrown at half cock, and a premature discharge of the piece is avoided, or at least much less likely to take place than with other fire-arms. It consists finally in the arrangement of a swell and suitable notch on the hammer, in combination with the pusher, and with the hinged breech block, so that when the breech block is closed the point of the pusher is not allowed to interfere with the usual motion of the hammer; but when the breech block is being closed while the hammer is down, the point of the pusher drops into the notch of the hammer and throws the same at half cock, thus preventing the premature discharge of the piece, without requiring any further attention.

PUNCH.—W. A. REX, Newville, Ind.—This invention has for its object to furnish an improved means by which the cutter tubes may be readily and quickly attached to and removed from the stock, and securely held therein while the tool is being used.

COMBINATION FLOUR SIFTER, BREAD MIXER AND DOUGH KNEADER.—This invention has for its object to furnish a convenient apparatus for quickly and thoroughly sifting flour or meal, mixing it into dough, and kneading the dough, either of which operations may be performed independently of the others, at the will of the operator.

GATE.—S. S. KAPPEL, Woodhull, Ill.—The object of this invention is to construct a gate for farms and railroads, so constructed as to obviate the necessity of getting out of the vehicle to open and close the gate.

STOVE.—J. P. BROADMEADOW, New York City.—This invention has for its object to facilitate and make more convenient the operation of kindling fires in stoves.

POSTAL WRAPPER.—EDEN REED, Joliet, Ill.—The object of this invention is to provide a postal wrapper intended for doing up bundles of letters for transportation in the mails, that shall be durable and convenient.

WASHING MACHINE.—W. C. TAGGERT and EDWIN APPLEGATE, Fayettville, N. Y.—This invention consists in suspending the rubbing board on capped pivots, which work in double grooves made in suitable standards attached to the tub or body of the machine, whereby the rubbing board is allowed to move freely up and down to adjust itself to the quantity of the clothes being washed.

SHELVING FOR WAGONS.—GEO. R. CANNON, Guildford, Ohio.—This invention consists in the manner of securing the cross beams to the top rails of the wagon box, whereby each beam is applied and detached separately from the other.

SAFETY POCKET.—A. T. LARGE, Tomah, Wis.—This invention consists in a clasp to be applied to the mouth of the pocket, which is self-locking, but which may be unlocked quickly and without difficulty, the whole being concealed from view.

SLEIGH AND SLED.—D. A. T. BLACK, Ray's Hill, Pa.—This invention consists in combining a set of wheels, levers, and bars with each other and with the frame of a sleigh or sled, for the purpose of enabling the said wheels to be used for transporting the sleigh over bridges or other places of the roadway which may be bare of snow; and also for retarding the velocity of the sleigh in going down hill.

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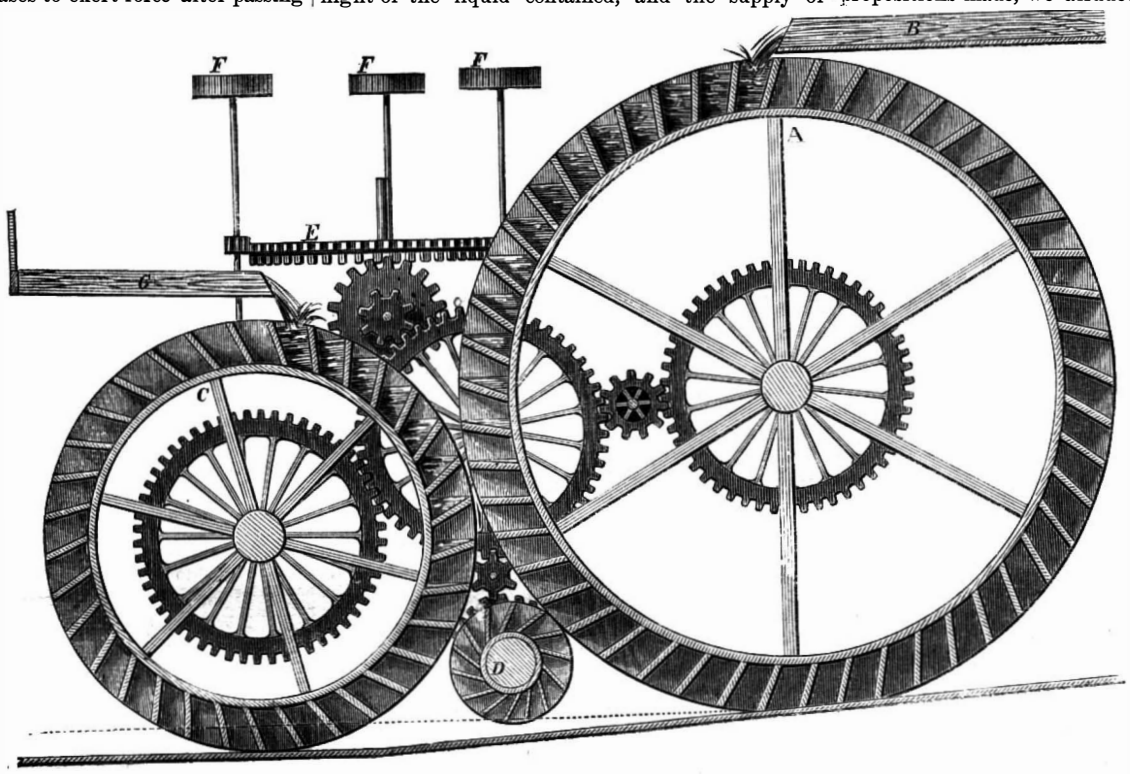
Improved Combination Water Power.

Attempts are being constantly made to utilize the steam, which, after having driven the piston of the engine in one direction, is discharged into the atmosphere. Devices have also been contrived for deriving more power from the weight of water, used in driving over-shot and breast wheels, than is ordinarily obtained. Of this character is the invention illustrated in one form in the engraving.

It consists in a combination of water wheels, one using the water discharged from the other, and all connected, by proper gearing, to one common receiving shaft. The inventor claims to derive power from the water, which ceases to exert force after passing a given point below its center, by receiving the water into the buckets of a wheel smaller in diameter, but of equal bucket capacity,—which becomes a breast wheel, and, in turn, discharges into a third supplementary wheel that utilizes the waste water and contributes its quota of power.



KRATZER'S COMBINATION WATER POWER.

By reference to the engraving the design of the inventor can be clearly comprehended. A is the main wheel, being of the ordinary over-shot pattern.—The water delivered from the flume, B, discharges just below the center of the wheel into the wheel, C, the buckets of which are thereby filled, and, as it revolves, discharge into the small wheel, D. These three motors are connected by gears, as may be seen, with the double cogged wheel, E, which represents, with the runners, F, the method of applying the power to a mill with different run of stones. Of course the mode of transmission of the power from the receiving shaft is immaterial.

Although, in the engraving, the two main wheels are represented as working in combination, either can be detached, and, at a low stage of water, the wheel, C, might be run from the flume, G, independent of the larger wheel, while still delivering water to the supplementary driver, D; or, for the same reason, a leader might operate the large wheel as a breast wheel, and another, at the same time, drive C as an over-shot.

The inventor claims a positive increase of power by this combination, as well as a utilization of the power now wasted. It can be applied, with the necessary modifications, to any fall of water. It was patented June 26, 1866, by Louis Kratzer, whom address for further particulars, or for rights, at 246 Eager street, corner of Central avenue, Baltimore, Md.

Improved Mode of Distilling.

Congress seems determined, very properly, we think, that whisky shall pay its full share of the national debt. Measured by the raw material consumed, and the capital invested, the whisky interest is one of the largest in the country. Such a prominent industry has, of course, attracted the attention of our ingenious inventors, and some of them have originated improvements in it which are of national importance.

One of the successful inventors is Mr. H. G. Dayton, of Maysville, Ky., and his system, compared with the methods now commonly practiced at the West, seems to be new and complete, since by his arrangement the purest whisky can be distilled without running any low wine whatever.

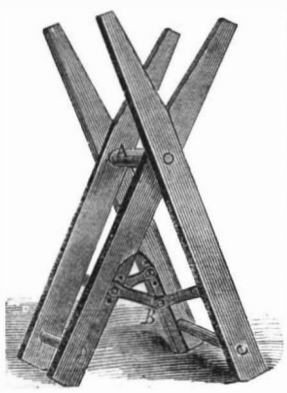
Mr. Dayton's apparatus is a combination of two stills, in such a way that the product of the first still is led into the second still, from which it escapes redistilled and sufficiently purified. The same steam which boils the liquor also serves to heat the mash, and the liquor is never permitted to run under proof from the second still, for as soon as this takes place the contents of said still are pumped back to the first still, from which the waste is finally discharged.

At the still house, still No. 1 is set in the second story, and its worm leads down to still No. 2, which is set in the first story. The mash is, of course, fed only to No. 1. Both stills are heated by steam, at a pressure not to exceed 10 lbs. per inch. The lower still is provided with a gage which shows the hight of the liquid contained, and the supply of heat and of liquid to the two stills is so adjusted that the liquor which distills from No. 2 is never under proof. The steam which escapes from the still heaters is condensed, and the distilled water is used to dilute the distillate of No. 1 to the commercial standard of whiskey.

These are the main features of Mr. Dayton's system of distillation, but his improvements relate also to some details which cannot be explained without an illustration. Practical distillers will easily understand that the whisky from this apparatus may be far above the average quality. A sample sent to this city a short time since was pronounced to contain as little fusil oil as cologne spirits; and it is stated that by this process a quantity of double-distilled copper whisky can be obtained equal to the quantity of high wines obtained by the ordinary process.

FAY'S IMPROVED SAW-HORSE.

The common saw-horse, when stored in large numbers, or singly in a small wood-house, monopolize considerable room. In the improvement herewith illustrated the implement is made to fold together so that it can be hung up on the wall, or packed in number-- very closely for ships ping. The jointed bra ces also strengthen is greatly.



The center bar, A, it a pivot on which the uprights swing. Ribs of iron are recessed into alternate sides of the legs, to which are attached jointed cross-bars, B, which, when brought to a horizontal position, rigidly secure the standards and hold the horse in position for use. By depressing the connections, the legs are brought together parallel, and the horse can be more conveniently transported or stored away.

It was patented through the Scientific American Patent Agency, March 15, 1864, by C. J. Fay, of Hammonton, N. J. For rights and further information address as above.

SIGNALS ON ENGLISH RAILWAY TRAINS.

The English have one great want which, in spit of repeated experiments and numerous patents, seems to be far from being gratified. We allude to a device for stopping a train by communication with the driver in case of danger. To one of the many propositions made, we alluded in our issue of Sept. 22d. That consists of an elaborate complicaition of "galvanometers," "levers," "keys," "engraved tablets," and "bells," but does not seem to have answered the requirements of the railway companies nor the public.

The *Engineer* of Oct. 26th contains a description of a wonderful contrivance to secure intercommunication between the different carriages of a train, which appears to be even more intricate. In addition to a movable bridge to connect the cars, so that the guard may pass from one to the other on the outside of the train, there are two dial plates on each carriage, all connected by straps and universal joints and worked by cranks and a system of gears. Each of these disks can, by means of a pointer, transmit and register twelve signals. The dials are connected by a shaft passing through the carriage near the roof. There is no evidence that the passengers can communicate either with the guard or the engine driver.

Engineering of the same date has a notice of another remarkable invention, directed to the same end. A movable panel, thirty by twenty inches, is placed in the partition between the compartments of a carriage. This, the *Engineer* naïvely says, "gives ample space to admit a person from one compartment to another." Imagine a burly farmer or obese diner-out, or a fashionably dressed lady of the present period, crawling through an aperture hardly large enough for the door of a dog kennel! This panel is opened by a brass handle encased in transparent talc, "which requires to be broken or torn away before the handle can be moved!" Small chance; it seems, for a Briggs, caged in one of these compartments with a murderous Müller. The opening of this panel, however, fires off two rockets from the top of the car, which explode with noise sufficient to be heard above the din of the train, and in the night exhibit colored fire.

All this is very nice and elaborate, but we think an improvement might still be suggested. Let each passenger be provided with a thirty-pound shell, or a tin of nitro-glycerin, and when he wishes to communicate with the guard or driver, dash it through the window. Either of these is of course preferable to the American device of a simple cord and bell.

A MAMMOTH casting was lately made at the Charlestown, Mass., Navy Yard; it was about one-half of the bed of a planer, the whole machine destined to weigh about 195 tuns. The section cast will weigh thirty-nine tuns when cleaned. The iron was from the machinery of the old United States steamer *Richmond*. Two months were required to make the mold, forty-one tuns of metal were used, and eight days elapsed before this, the largest casting ever made in New England, became cool.

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COPARTNERSHIP OF CAPITAL AND LABOR.

For several years there has been manifested a growing divergence between the employer and employé—between the capitalist and laborer—until it has assumed a form, if not of antagonism, at least of disagreement. The laborer has asserted that the capitalist was opposed to him, and while perhaps acknowledging that, naturally and properly, capital and labor are mutual helpers and co-workers, has believed that in fact capital exploited labor to its own selfish advantage. This belief has given birth to trades-unions and labor associations, movements in favor of reducing the legal hours of labor, and strikes and combinations intended to place labor in the position which, it is asserted, has been usurped and occupied by capital.

We never believed in the necessary opposition of capital to labor, having faith in the humanity and good sense of both the employers and employed. We believed that in time all these matters would be adjusted without the intervention of politicians and without recourse to penal enactments. We are glad to see that, so far as isolated instances and single trials can testify, our opinions have been sustained.

Some time ago we observed in our English exchanges accounts of meetings of the employers and employed of two concerns, one a colliery in Yorkshire, and the other of a cotton manufacturing establishment in Manchester, both of which had tried successfully the financial union of capital and labor, or, rather, had been conducted on a modified plan of the joint-stock principle.

The owners of the Yorkshire colliery became wearied with the frequent antagonisms between themselves and their workmen, in disputes about wages, etc., and determined to try a new plan. Agreeing among themselves that an annual profit of ten per cent was a fair return on their investment, oversight, and running expenses, they proposed to their workmen to divide with them all earned above that amount. The capital was divided into shares small enough in amount to enable any workman to become a stockholder, and then for those who did not choose to invest, but who had worked for a certain time for them, a bonus was offered on the profits over ten per cent, proportioned to the work done, or the amount of wages received.

The result of the first year's experiment was wonderful. The company earned nineteen per cent clear profit, leaving, after reserving £5,000 for increase of working capital, and paying the ten per cent on the original capital, the sum of £1,800 to be distributed as bonus among the workmen, in addition to the ten per cent of those who had become shareholders and the increased value of their stock by the addition of the £5,000. Everybody was satisfied. The original owners made more than they had done previously, while the workmen received an increase of pay.

The Manchester establishment made an equally satisfactory experiment. The firm bound themselves, formally, to divide among the operatives, in proportion to the wages received, all the profits over fifteen per cent. It was found that the profits perceptibly and gradually increased, not only in the amount of goods actually produced, but in the saving of oil, yarn, cotton, and in the better quality of the goods. The result was, that at the end of the year both employers and employed were pecuniarily benefited.

Apart from this visible and material advantage, we may suppose that these successes have also a moral effect on the workers. No longer regarding themselves as the mere servants of an employer, destined only to swell his annual profits, they are copartners, and feel that every improvement in the manner, or the result, of their work, is a direct benefit to themselves. We can see no reason why a similar system could not be adopted in this country with benefit to all concerned. It would, at least, tend to quiet the agitation of the vexing question of the relations between capital and labor.

PREVENTION OF BOILER EXPLOSIONS.

In an article published in this journal Nov. 3d, we spoke of the practice and belief which attributes every boiler explosion to some mysterious and unknown agency. In all cases prevention is better than cure; and we believe that if precautions, properly enforced, were observed, we should have fewer of these destructive occurrences.

It is a notable fact, and, to us, a humiliating fact, that in no country are boiler explosions so frequent as in this. In continental Europe they are proportionally less than one-tenth of those in Great Britain, and less than one-twentieth of those in the United States. There is some reason for this important discrepancy, apart from the difference in the material used. It would not be entirely true to say that the boiler-makers of Europe are superior in skill and prudence to those in this country. We know that our iron is, at least, equal to that used abroad. The cause, then, must be sought in some other department. It is the want of a proper supervision and examination of the work done. That supervision may be exercised by Government agents, or by the agents of an association; but, in either case, it should be exercised by competent and disinterested parties.

We are aware that such a supervision is to some extent exercised, but it is made public oftener by *post mortem* examinations of boilers and the bodies of the victims to their explosions, than by giving a sense of security to the community. And in these *post mortem* examinations the reports of the jury are oftentimes so ridiculous as to raise a laugh in spite of the tragical seriousness of the subject.

The London *Artisan* says that "in most countries of continental Europe laws have been enacted, and Government decrees issued from time to time, for the purpose of protecting life and property from the dangers incidental to the use of steam generators. Thus, in France, a Government license is required for erecting a steam boiler in any inhabited place, and its grant is made dependent on the result of the so-called *enquête de commodo et incommodo*, that is, a preliminary inquiry by the local authority, in which every opposition on the part of the local interestees, unless overruled as vexatious or unfounded, will prove fatal.

There are, moreover, official formulæ for the relative thickness of boiler plates and pressures of steam, and a Government stamp is affixed to every boiler, stating the utmost pressure, in atmospheres, to which it may be subjected. To insure the strict carrying out of the rules and regulations, a Government inspector (mostly of the corps of *ingénieurs des mines*) is appointed, who pays, from time to time, unexpected visits to the boilers of his district, and heavy fines are enforced wherever safety valves are overloaded, or the proper precautions overlooked. Similar regulations are in force in the German States, in Belgium, and most other countries of the continent; the supervision is intrusted to the 'building inspectors' in Prussia, to mining engineers in Belgium. The strict control exercised by the various governments over all steam generators, both those actually in use in the respective country and those intended for exportation, forms a kind of moral pressure on manufacturers and users."

The principal objection to this oversight arises from the fact that the Government employés are not always selected for their practical knowledge of mechanical engineering. And a system of private, or, rather, corporate supervision has been deemed preferable. In the Grand Duchy of Baden, there has lately been formed a mutual company which has its employed agents to inspect boilers made and owned by the members, and which gives the members a protection, in the way of insurance against pecuniary loss in the case of a boiler explosion.

There is a similar society in England, known as the "Manchester Association for Prevention of Steam Boiler Explosions." But its operations and direct influence are restricted. According to Chas. Ryland's, *Iron Trade Report*, not one-fourth of the manufacturers in the counties where its members reside, are included in the list of those whose boilers are open to inspection. One association established in London existed only a twelve-month.

In this country we have a Congressional law which compels the examination and test yearly of boilers for steam vessels. In many, if not most, of the States a similar law exists, which compels a similar test to boilers of stationary and locomotive engines. The examiners in the latter case are appointed by the executive on the recommendation of practical engineers. Satisfactory qualifications as to ability are required, qualifications satisfactory, at least, to the appointing power.

The proprietors of a boiler state to the inspector the pressure per square inch they wish to carry, and he proceeds to subject the boiler to a hydrostatic pressure one-third more than the working pressure required. If the boiler stands this test it is passed as competent for the service required, and a certificate is issued. We are not aware that, in addition to this water test, the examiner institutes an examination into the quality of the boiler plate used, the fit of the rivets, the character of the calking, or the number and location of the stays or braces. If the boiler stands the hydrostatic pressure it is considered well calculated for its work.

It seems as though such a test was a very unsatisfactory one. The test by water may be all the boiler can bear. It may be that if continued it would rupture the boiler in some part. It makes few allowances for wear, corrosion, the effects of heat, and for carelessness, or negligence. It takes, if any, small account of the defects in material and workmanship. The test may impose a pressure quite as high as the boiler can bear without rupturing. In one word, the testing is begun at the wrong end. It should commence with the selection of the material, follow it through its processes of rolling, punching, riveting and calking, and end the trial with a final test on the completed boiler. This plan adopted and followed, we are confident, disastrous explosions would be less frequent.

What is the remedy? Assuredly not in legal enactments alone. It will be reached only by mutual action among boiler makers and engine owners. An association similar to that of Manchester, England, which is a mutual insurance company against boiler explosions, would probably exert more influence, favorable to the action and durability of boilers, than any penal laws or governmental appointments. As matters now stand, the inspector's certificate being granted for one year, if an accident occurs which cannot be traced to low water or inordinately high pressure, the law, by means of its jury of examination, not unfrequently protects the owners and managers of the boiler by a verdict of an explosion from some mysterious and unknown cause; or, as in the explosion of the *Gen. Lytle*, which occurred last August, attributes the accident to the undue thickness of

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the boiler plates, or some equally reasonable cause! In this case the inspectors recommended a law forbidding the use of boiler plate of a greater thickness than one-fourth of an inch or of boilers of a larger diameter than forty-two inches on high pressure boats!

If this is one of the specimens of United States Inspectors' engineering lore, it is time the mechanics of the country took this matter in hand. They can attend to the manufacture, test, and examination of boilers to the satisfaction of the community if they choose to do so.

American War Engineering.

In an abstract of the report of Brig. Gen. D. C. McCallum, Military Director and Superintendent of Railroads in the United States, by appointment of the War Department, we find the following specifications of services rendered by his construction corps:

"Some of the achievements of Gen. McCallum's department deserve to rank with the most remarkable engineering feats of modern times. The wonderful bridge over the Chattahoochee, seven hundred and eighty feet long and ninety-two feet high, was built by the construction corps in four and a half days; the bridge over the Potomac Creek, at Aquia, four hundred and fourteen feet long and eighty-two feet high, was built ready for trains to pass in forty working hours. In their leisure time this corps rebuilt the Chattanooga rolling mills, which turned out in a few months nearly four thousand tuns of railroad iron for the Government, and were sold at the end of the war for a hundred and seventy-five thousand dollars. With justifiable pride Gen. McCallum classes the attempt to supply Sherman's army of a hundred thousand men and sixty thousand horses and mules, from a base three hundred and sixty miles distant, over a line of a single track, as one of the boldest ideas of the war. Whole corps, and even armies, were frequently transported hundreds of miles on the mere verbal orders of their commanders. In 1865 the Fourth Army Corps were transported from East Tennessee to Nashville, a distance of three hundred and sixty miles, without delay or difficulty—this herculean task requiring nearly fifteen hundred cars. Nor were the services thus rendered unattended with danger. Guerrillas and raiding parties dogged the footsteps of the construction corps wherever they went. In the first six months of 1865 one wrecking train picked up and brought into Nashville sixteen wrecked locomotives and nearly three hundred carloads of wheels and bridge iron, the destructive handiwork of rebel raiders. Hood was a thorn in McCallum's side; but the damage he did was repaired with wonderful celerity. In October, 1864, Hood, passing round Sherman's army, tore up thirty-five miles of track and burned four hundred and fifty feet of bridges between Chattanooga and Atlanta. The damage was made good and the line put in working order again in thirteen days. Between Tunnel Hill and Resaca twenty five miles of track and two hundred and thirty feet of bridging were reconstructed in seven days and a half."

OUR LONDON LETTER.—We call the attention of our readers to the able letter of Mr. Frederic J. Slade, who has gone to Europe, and will correspond with this journal, giving its readers the latest news in the European scientific and mechanical world. His letter in this issue, describing the London railways, will be found specially interesting to the authorities of our large cities, as well as instructive to all.

DRAINING on a gigantic scale is being carried on in France. No less than three hundred and fifty thousand square acres are undergoing this salutary process, while five hundred thousand square acres additional have been surveyed with the idea of being reclaimed. The most important public works, however, are the river embankments. Operations of this character have begun in sixty-four departments, whereby nineteen river courses will be dammed up, requiring a total length of embankments measuring eight thousand English miles.

THE public debt on the 1st of November was $2,551,370,000, which shows a reduction of $20,000,000 during the month.

ISSUED FROM THE U. S. PATENT OFFICE

FOR THE WEEK ENDING NOV. 6, 1866.

Reported Officially for the Scientific American.

☞ Pamphlets containing the Patent Laws and full particulars of the mode of applying for Letters Patent, specifying size of model required, and much other information useful to inventors, may be had gratis by addressing MUNN & Co., Publishers of the SCIENTIFIC AMERICAN, New York.

59,335.—FLOUR SIFTER, MIXER, AND KNEADER.—E. A. Adams, Boston, Mass.

First, I claim the combination of driving mechanism, B D E, below the pan, G, with the said pan and with sifting, mixing, or kneading mechanism within it, substantially as and for the purposes set forth.

Second, The combination of the central driving shaft, F, with the mixing pan, G, and tube, y4, substantially as herein shown and described.

Third, The construction of the agitator with a socket hook, substantially as herein shown and described.

Fourth, The employment of the detachable sifter in combination with the mixing pan and central driving shaft, substantially as herein shown and described.

Fifth, The protecting cone, h3, in combination with the sifter and central driving shaft, substantially as herein shown and described.

Sixth, The combination of the sifter, H, and the agitator, I, with each other and with the shaft, F, and mixing pan, G, substantially as herein shown and described.

Seventh, The employment, in combination with the driving shaft, of a detachable mixing device, substantially as and for the purpose herein shown and described.

Eighth, The employment, in combination with the driving shaft, of a detachable kneading device, substantially as and for the purpose described.

Ninth, The employment, in combination with the central tube or stationary roller, of a kneading roller which revolves upon its own axis, and also rolls around the said stationary roller, substantially as and for the purpose herein shown and described.

Tenth, The combination of the gear wheels, k2 k4, or their substantial equivalents, with the driving shaft and the kneading roller, substantially as herein shown and described.

Eleventh, The employment of the adjustable guard plate, k6, with the gear, k2 k4, substantially as and for the purpose shown and described.

Twelfth, The employment of the frame, k3, in combination with the gear wheels, k2 k4, substantially as herei shown and described.

Thirteenth, The combination of one or more scrapers with the gear frame, k3, substantially as herein shown and described.

Fourteenth, The lugs upon the gear wheel, k4, in combination with corresponding recesses in the tube, g4, substantially as and for the purpose herein shown and described.

Fifteenth, I claim a mechanism capable of use at will as a sifter or a mixer or a kneader, constructed and operating substantially as herein shown and described.

59,336.—APPARATUS FOR COOLING MALT LIQUORS.—William Allenderff, Philadelphia, Pa.

I claim the construction of a cooling apparatus by the combination of a series of inside tubes, E E, with an equal number of outside tubes, C C, and their end connections, D D, all arranged substantially as described in the foregoing specification and for the purpose specified.

59,337.—CAR-TRUCK STANDARD.—William T. Altfather, Johnstown, Pa.

First, I claim the sockets, D and a', provided with grooves, f, in combination with the bed timber, A, and side board, B, substantially as herein shown and described and for the purpose set forth.

Second, I claim the standard, E, provided with the pin or bolt, w, in combination with the sockets, D and a', substantially as herein shown and described.

59,338.—NON-CONDUCTING COVERING FOR STEAM BOILERS, PIPE, ETC.—E. H. Ashcroft, Lynn, Mass.

I claim a non-conducting covering for steam boilers, pipes, etc., composed of the materials above named and applied as described.

59,339.—COTTON-SEED PLANTER.—Nathan E. Badgley, New York City. Antedated Oct. 4, 1866.

First, I claim the construction of the opener frame, V, with its draft hook, D, and the manner of fastening the handles thereto.

Second, The revolving, cylindrical, flanged head hopper around a permanent shaft with its elevating agitators, E, and stationary rod, R.

Third, The slip hoop, S, with holes to regulate the planting either in drill or spots, as herein described.

Fourth, The adjustable coverer, L, with its teeth, T, and conductor, N, attached as herein described.

Fifth, I also claim the combination of the several parts and devices, as herein described and substantially as set forth.

59,340.—LOCOMOTIVE ENGINE.—Wm. S. G. Baker, Baltimore, Md.

I claim the steam chest, D, exhaust openings, B I, and steam ports, C C, formed within the bed plate, G, in connection with cylinders of locomotive engines, in such a manner that the steam supply and exhaust discharge pipes are shortened and number of steam joints reduced, substantially as and for the purpose specified.

59,341.—REVOLVING TABLE.—Pardon Barrett, Jackson, Pa.

I claim a table composed of a stand or support, A, having a screw, C, fitted in its upper end, and an upper part, B, provided with drawers and a nut, G, placed centrally within it for the screw, C, to pass through, and a cap, H, to fit over the screw, substantially as and for the purpose set forth.

59,342.—METHOD OF TREATING CORK FOR MATTRESSES, ETC.—Louis Bauhoefer, Philadelphia, Pa.

First, I claim subjecting particles of cork to be used as a stuffing for mattresses, etc., to the action of the products of combustion obtained by burning wood, tan, or other suitable material, substantially as and for the purpose described.

Second, Charring or partially burning the particles of cork to be used as a filling material, for the purpose set forth.

Third, Subjecting the cork to the action of the fumes or vapors arising from heated aromatic substances, as and for the purpose specified.

59,343.—BROOM HEAD.—E. M. Bayne, Uniontown, Pa.

I claim the combination with the handle, C, screw, B, and cap, A, of the ferrule, D, and nut, E, when the said nut is firmly brazed or otherwise securely attached to the said ferrule, so as to be a solid part thereof, substantially as and for the purpose set forth.

59,344.—CAPPING SCREWS.—J. W. Bishop, New Haven, Conn.

I claim the combination of a centrally-perforated metal cap with a centrally-perforated screw head, substantially in the manner herein set forth.

59,345.—SLEIGH.—D. A. T. Black, Ray's Hill, Pa.

I claim the combination and arrangement of the wheel levers, F, with shoulders, e', and bars, I and J, with the sleigh, whereby they are held in their lowered position for wheeling the sleigh by the forward draft of the sleigh, in the manner described for the purpose specified.

59,346.—DIAPHRAGM FAUCET.—William Blake, Boston, Mass.

I claim the improved diaphragm faucet constructed with the tubular extension, F, the chambered body, A, the exit pipe or passage, G, and the inlet pipe, F', arranged together and with the diaphragm, B, the valve, E, the screw, D, and the cap, C, substantially in manner and so as to operate as hereinbefore explained.

59,347.—COCK EYE.—Christian Boehmer, Jr., Madison, Wis.

First, I claim the socket, A, in combination with the trace, C, for the purposes and substantially as herein shown and described.

Second, The cock eye provided with a cross bar, as shown and described, in combination with the socket, A, substantially as and for the purposes set forth.

59,348.—COMPOSITION FOR ROOFING.—John F. Boynton, Syracuse, N. Y.

First, I claim gas tar, rendered anhydrous, as described, in combination with the dead oils distilled from gas tar, as a material to be used in preparing a roofing cement, by mixing therewith ground clay and other similar substances.

Second, I claim as a roofing cement, a combination of gas tar rendered anhydrous, as described, with pulverized clay and the dead oils distilled from gas tar.

59,349.—VAT FOR EVAPORATING SALT WATER.—John F. Boynton, Syracuse, N. Y.

First, I claim the central boards, as specified.

Second, I claim the rollers with multiplied surfaces.

Third, The dark color of the rollers for the absorption of heat, as herein specified.

Fourth, I claim the arms with fans upon the rollers.

Fifth, I claim the arrangement which causes the water, by its gravity, to work its own evaporation, substantially as described.

58,350.—LARD BOILER.—William Branagan, Burlington, Iowa.

First, I claim the employment of a perforated distributing plate, or its equivalent, between the walls of a double-wall lard boiler, in combination with the steam inlet pipe, substantially as and for the purposes described.

Second, Providing a double-wall lard-rendering kettle, A, with stirrer, air cocks, and an outlet pipe, having a strainer, h, applied to it, substantially as described.

59,351.—COOKING STOVE.—J. P. Broadmeadow, New York City.

First, I claim forming the stove with a recess, H, beneath the oven, extending from the fire chamber, D, to the back part of the stove and of sufficient capacity to receive and contain one of the fire boxes, F or G, substantially as described and for the purpose set forth.

Second, The combination of the shaft, J, levers, L, guides N, slides, M, supports, P, and lever, K, with each other, with the sides of the stove, and with the fire box, substantially as described and for the purposes set forth.

Third, The combination and arrangement of the sliding ash pan, S, when constructed as herein described with the two fire boxes, F and G, with the recess, H, and with the fire chamber, D, of the stove, substantially as described and for the purpose set forth.

59,352.—PORTABLE REVOLVING SCREW PRESS.—Rhodom M. Brooks, Pike, Ga.

I claim the combination of the revolving press box with the outer frame which supports said box for the purpose of making a portable press, the several parts being constructed substantially as and for the purpose herein specified.

59,353.—WATER WHEEL.—Danforth H. Brown, Northfield, Vt.

I claim the arrangement of the lower friction roller ways, f, as projections directly from the chute, as and for the purpose described.

Also in combination with the gate, c, the construction of the upper part of the friction roller ways in two parts, f and g, when provided with means for their adjustment relative to each other, as described.

And the combination of the slotted cylinder, l, with the inner cylinder, m, its set screw, p, the lever, r, and moving fulcrum, s, operating together substantially as set forth.

59,354.—REED MUSICAL INSTRUMENT.—Riley Burditt, Chicago, Ill.

First, I claim the construction of a tremolo the valve of which is connected with and acted upon by the arm and spring, C, as herein specified and set forth.

Second, I claim the cut-off valve, E, when the same is constructed and used in the manner and for the purposes herein described and set forth.

59,355.—CAR BRAKE.—George E. Burt, Harvard, Mass.

First, I claim the combination of the wheel, D, the disk, G, the pawl, s, and the stud, F, with the spring, e.

Second, The lever, T, the spring, w, the arm, P and the brakes, S, in combination with the pivot, Y, operating substantially as described for the purpose set forth.

Third, The spring, m, in combination with lever, L, substantially as described and for the purpose set forth.

59,356.—SHELVING FOR WAGONS.—George R. Cannon, Guildford, Ohio.

First, I claim the securing the cross beams, B, to the top rail of the wagon, substantially as specified.

Second, The manner of securing the planks, C, to the cross beams, B, substantially as described.

Third, The employment of braces, D, for supporting the planks, C, between the cross beams, B, substantially as described.

59,357.—WATER-PROOF SOLE.—Oliver F. Case, New Haven, Conn.

First, I claim a whole sole having the ball filled with rubber or allied gum and vulcanized after having been so filled.

Second, A whole sole having the ball filled with rubber or allied gum in combination with a leather insole, substantially in the manner described, and the whole secured together by the process of vulcanization, as herein set forth.

59,358.—CULTIVATOR.—Lyman J. Caswell, Scott Township, Ind.

I claim the application of the turning armatures, F F F F F F, to the cultivator, to change the positions of the side shovels so as to form a shovel plow or a cultivator. The application of the braces, G G, to sustain the side beams and side shovels in their proper positions.

The application of the braces, E E E, to the shovel standards to elevate and depress the shovel points and turn the sod or sward. The application of the curve to the extension mold plates. The mortise in the ends of the shovel standards and the flattening the points of the shovels.

59,359.—LAST.—Perez C. Clapp, Dorchester, Mass., assignor to himself and R. W. Turner, Milton.

I claim combining with the last block and last, the spring bolt or latch, arranged to operate substantially as described.

59,360.—MACHINERY FOR THRASHING FLAX.—Stillman A. Clemens, Chicago, Ill.

First, I claim the combination of toothed cylinder, b, with crushing rollers, c and c', or their equivalents, substantially as described and for the purposes set forth.

Second, The combination of cylinder, b, and crushing rollers, c c', with the vibrating sieve shoe, h, fan, q, and air trunk, r, substantially as described and for the purposes set forth.

Third, The crushing device consisting of roller, c', and spring, plates, W, substantially as described and for the purposes set forth.

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the metal placed therein in two places at one time, and operating substantially as herein set forth.

59,465.—SUSPENDERS.—James B. Sharp and R. M. Seymour, New York City.

We claim as an article of manufacture a pair of suspenders tipped or fastened by a metallic plate, secured substantially as described.

59,466.—SCHOOL DESK AND SEAT.—Calvin W. Sherwood, Chicago, Ill.

First, I claim the joint composed of the naves C', and axle, B', constructed and operating substantially as and for the purposes specified.

Second, The arrangement and combination of the arms, c, naves C', and axle, B', with the seat, D, and standards, A, substantially as specified.

Third, The jointed braces, F, when provided with lips, a, and ledges, b, substantially as and for the purposes specified.

Fourth, The combination and arrangement of the ledges, b, lips, a, and pins, d, with the braces, F, and hinged shelf, K, substantially as specified.

Fifth, The arrangement and combination of the hinged arms, H, jointed braces, F, and hinged arms, G, with the standards, A, and desk top, I J, substantially as and for the purpose specified.

59,467.—FILTER.—Thomas Simmons, Chicago, Ill.

First, I claim the arrangement and combination of the cap, K, cloth, J and I I I', cotton, W, and follower, B, with bar, C, screw, H, and foot, D, substantially as set forth.

Second, in combination with the foregoing, the nozzle, o, cap, S, stopper, T, with the tube, R, and pipe, M, as described and set forth.

59,468.—PLOW.—M. T. Smith, Keeler, Mich.

I claim the roller, F, and bar, D, connected together and applied to the plow beam, A, to operate in the manner substantially as and for the purpose herein set forth.

59,469.—MACHINE FOR HANDLING HIDES.—John Snell, Jr., Potterville, Pa.

I claim the hanging frame, B, adapted for longitudinal reciprocating motion, having bars, K, and hooks, substantially as described for the purpose specified.

59,470.—BED BOTTOM.—David Spore, Sharon, Wis.

I claim the combination of the slats, D, and the slanting pieces, C, supported by the oblique sockets in the sills, substantially as described and represente

59,471.—BEEHIVE.—J. H. Starr, Middleburgh, N. Y.

I claim the bases, b, constructed and perforated, or slotted, as shown, and placed within a bee house or structure, A, provided with detachable or removable sides, substantially as and for the purpose set forth.

59,472.—TOOL FOR MAKING TENONS.—D. H. Stephens, Riverton, Conn.

I claim the employment of a third or middle saw between the two or its equivalent, which cuts the end of the tenon of the length required, in combination with the other two saws.

59,473.—APPARATUS FOR CARBURETING AIR.—Levi Stevens, Fitchburg, Mass.

I claim the combination as well as the arrangement of the hydrocarbon-holding vessel, A, the float, B, the box, C, with its absorbent materia, the tube, D, and the receiver, E, provided with the stuffing box, e, or its equivalent, the whole constituting an improved hydrocarbon vaporizing apparatus.

I also claim the combination as well as the arrangement of the cistern, F, or the same and the water jacket, I, with the said hydrocarbon vaporizing apparatus.

I also claim the above described arrangement of the airometer, G, with the vaporizing apparatus, made substantially as described.

59,474.—APPARATUS FOR CARBURETING AIR.—Levi Stevens, Fitchburg, Mass.

I claim the combination as well as the arrangement of the chamber, c, the annular space, b, the sponge chamber, D, the perforated partition, H, and the space, E'.

I also claim the combination of the sponge, d, and the extension, F, with the chambers, E and C, and the sponge, t, and the partition, H, made and arranged in manner and so as to operate as specified.

59,475.—CHEESE PRESS.—William H. Stevens, Winona, Minn.

I claim a cylindrical atmospheric cheese-press, constructed and operated substantially as described and for the purposes set forth.

59,476.—PILE DRIVER.—John Jacob Studer, Richmond, Ind.

First, I claim the combination of the valve stem, O, yokes, i and t', lever, f', wrist, C', and cylinder, C, substantially as and for the purpose set forth.

Second, The arrangement of the valve, p, with its chest and the ports, u and w, substantially as set forth.

Third, The arrangement of the plates, r r', set screws, w, and clamps, u, substantially in the manner and for the purpose set forth.

Fourth, Supporting a pile driver on elastic cushions, substantially as and for the purpose set forth.

59,477.—WASHING MACHINE.—W. C. Taggart, Fayetteville, N. Y.

I claim the grooved beveled ribs, a a, in combination with the bottom of the tub, A, and face of the rubbing board, C, the beveled side being placed toward the respective ends of the machine, and operating substantially as described for the purpose specified.

59,478.—TOBACCO PRESS.—James M. Talbott, Richmond, Va.

First, I claim the retaining frame herein described, the same consisting of the threaded columns, C C, head, T, bottom, B, follower, F, and nuts, r r, said follower being adapted to be slidden upon the columns so as to compress the tobacco, and then held in position by the nuts, r, so as to retain the tobacco in its compressed state, substantially as set forth.

Second, I claim the springs, e, applied to the truck of the hydraulic ram in the manner described, so as to sustain the same when not in act on, but permit it to be depressed to find a firm and solid bearing on the press bottom when the power is applied so as to relieve the axles from pressure, as explained.

Third, I claim a movable hydraulic ram, in combination with a stationary retaining frame, substantially as describe .

Fourth, I claim a double truck, d d S S, which enables the hydraulic ram to be moved two ways, substantially as described.

Fifth, I claim the combination of the double truck and hydraulic ram with the stationary retaining frames, substantially as described.

59,479.—TOOL FOR MAKING HORSESHOES.—Thomas G. Thompson, Oswego, N. Y.

I claim the combination of the spring-holder chain and foot lever with the anvil block and anvil, all constructed and arranged as and for the purpose described.

59,480.—STEAM-ENGINE SLIDE VALVE.—Esau D. Taylor, Hornellsville, N. Y.

I claim, First, The valve plates, D D', provided with the arms, F, in combination with the taper key, J, substantially as described.

Second, The valve, D D', provided with the arms, F, and taper key, J, in combination with the springs, H, to keep the valves in position when steam is not present, and to permit the valves to yield to back pressure in the cylinder.

Third, In combination with the taper key, J, the adjusting screw, Q, substantially as and for the purpose set forth.

Fourth, The valve, D D', in combination with the yoke, L, and hollow stem, M, substantially as and for the purpose set forth.

Fifth, The taper key, J, in combination with the steady pins, p p', substantially as described.

59,481.—MODE OF WASHING SAND.—James Todd and Albert G. Downer, Fayette, Pa.

We claim a new mode of lifting or raising the sand from the muddy water by means of elevators and elevator boxes, both shaped as herein described, for elevators to work in, with pulleys and drums, and the manner in which each box discharges the muddy water from the sand.

59,482.—BORING TOOL FOR WELLS.—W. B. Trunick, Pittsburgh, Pa.

I claim, First, The self-acting boring tool, turning apparatus, applicable to any ordinary boring rigging, composed of the pinion, F, racks, H K and L, dogs, O and P, lever, R, tappets, T and U, and catches, S S, combined with the lever, B, and arranged as described, or their equivalent.

Second, The two racks, K and L, oscillating with the beam, B, in combination with the stationary shaft, M, dogs, P and O, lever, R, catches, S S, and tappets, T and U, to obtain a self-acting go and come motion of the rack, K and L, on the beam, B.

Third, The spring, V, and set screw, Y, in combination with the bar, I, for the purpose of regulating the motion of the said bar, I, on the bar, B, and

Fourth, Turning boring tools automatically by the action of the oscillating beam, B, itself, by means and with the use of the apparatus herein described, or its equivalent.

59,483.—TRACE LOCK.—Daniel Tuttle, Plantsville, Conn.

I claim the combination of the tongue, C, and the ferrule or socket, B, constructed with ears, d, and notches, a, and the spring in the rear of the tongue when the shank, E, is enlarged within the socket, and so as to operate substantially in the manner and for the purpose specified.

59,484.—FIREPLACE.—Isaac H. Upton, New York City.

First, I claim the inclined plate, F, in combination with valves or dampers, J J, and rods, J' J', employed to retain or permit the the escape of heat, and arranged as and for the purpose specified.

Second, In combination with the above, I claim the air-heating space or chamber, E, formed and arranged substantially as and for the purpose set forth.

Third, In a fireplace for grates, constructed as herein described, I claim the perforated plates, L L L', arranged as described, and permitting a free circulation of air to and from the air-heating chamber, E, as set forth.

Fourth, I claim the arrangement of the grate chamber, B, pipe or flue, H, dampers, I J J, inclined plate, F, and air-heating chamber, E, as herein described, and for the purpose specified.

59,485.—CIGAR.—Charles Van Dyeck, Nashville, Tenn.

I claim, First, A cigar, with a filling of waste tobacco, inclosed in a paper wrapper, covered by an exterior wrapping of leaf tobacco, substantially as described.

Second, Such a cigar, when formed also with a mouth piece, b, and absorbent, c, arranged substantially in the manner and for the purpose set forth.

59,486.—WEATHER STRIP.—Joseph A. Vincent Fairburg, Ill.

I claim, First, The flange, C, with its finger, D, so applied to a door or window as to receive the upper edge of the weather strip between them, the flange, C, being bent vertically near its outer edge, and being free to pass over the strip when the latter is down, substantially as shown.

Second, I also claim placing the weather strip in front of the saddle of the threshold, and constructing it so that when the strip is not in operation, it lies level with the saddle, and when the door is closed the strip, F, will assume a vertical position, with a dead-air space between the strip and the saddle, substantially as described.

Third, I claim the combination and arrangement of the parts, C and F, substantially as described.

Fourth, I also claim the side packing, E, substantially as and for the purpose above described.

59,487.—WAR ROCKET.—J. J. B. Wallach, Baltimore, Md.

I claim, First, The self-adjusting balancing weight, C, in combination with the screw tail, B, and main body, D D', constructed, arranged, and operating in the manner substantially as shown and described and for the purpose set forth.

Second, The combination of the shell, F, tubes, f f', needle, h, and arm, e, constructed, arranged, and operating in the manner as shown and described and for the purpose set forth.

59,488.—ROLLING DIE APPARATUS.—Henry Waters, Boston, Mass.

I claim combining with the rolls, and a cam and weight in connection therewith, and a tongs or holder of the metal to be rolled, a spring so arranged that it may yield to allow the cam to move the mechanism which actuates the tongs faster than the metal held by the tongs is permitted to move by the action thereupon of the die grooves, substantially as described.

Also, the yielding nippers, in combination with the rolls, and any suitable means for working the tongs.

59,489.—MACHINE FOR PRESSING TOBACCO.—William H. Watson, New York City.

I claim, First, The use or employment of a pressing surface formed by combining a series of bars or plates, A, constructed and operating as described for the purpose specified.

Second, The combination with the same of a feeding or pressing surface formed by combining a series of bars or plates, B, when combined, constructed, and operating substantially as described for the purpose specified.

Third, Piercing the tobacco, substantially as shown, for the purpose described.

Fourth, Constructing the wheels operating the bars or plates, A and B, so that they shall force forward the same, as herein fully described, for the purposes set forth.

Fifth, The cutting apparatus, constructed substantially as described, for cutting the tobacco.

Sixth, The combination of the piercer with a movable table for the purposes shown.

Seventh, Combining with a tobacco pressing machine, a counting or registering apparatus, for the purposes set forth.

59,490.—COTTON-SEED PLANTER.—M. D. Wells, Morgantown, West Va.

I claim the reciprocating bar, B, constructed as described, and provided with flanges, D D, when used with the hopper, A, with false bottom and dividing board, C, in the manner substantially as and for the purposes herein set forth.

59,491.—BUSH HAMMER.—Albert Wheeler, Gloucester, Mass.

I claim the shoulder plates, A B, with the cavities, a3 and b3, in combination with the projections, a2 b2, as described, and with suitable cutters, and operating in the manner and for the purpose herein described.

59,492.—FENCE GATE.—B. J. Wheelock, Bedford, Ohio.

I claim the crane swing post, G, with the arms, L L', in combination with the roller, M, and gate, A, arranged and constructed substantially as and for the purpose specified.

59,493.—SMUT MACHINE.—William G. Willcox, Waterloo, Wis.

I claim the vertical corrugated beater wings, constructed in the form and manner described, and attached to the radial arms in such manner that the wings will have the relative position in regard to the case, substantially as shown and set forth.

59,494.—HOLD-BACK FOR CARRIAGES.—Edward Wilson, Northbridge, Mass.

I claim the clasp, A, when adjustable in combination with the hook, L, and knob, B, when constructed and operating in the manner and for the purposes above set forth and described.

59,495.—BOX-SETTER FOR CARRIAGE WHEELS.—Wynant Witbeck, Troy, N. Y.

I claim, First, The combination of the cam ring, D, and radially-sliding bars, B B B, having lugs, C C C, for griping a wheel by its rim, with fixed bearings, A A A, for a side of the rim of the wheel, and central sockets, E F, for a rotary endwise-movable boring spindle, substantially as herein described.

Second, I also claim a boring spindle, G, mounted in sockets, E F, and having its cutter, h, arranged between those sockets and fastened in a slot or mortise, i, in the spindle, by means of a sleeve, l, screw nut, j, and screw, k, on the spindle, substantially as herein set forth.

59,496.—MANNER OF STRAPPING BLOCKS.—Albert G. Wolf, Mystic River, Conn.

I claim an iron strap applied around a sheave block, so as to clear the ends of the sheave pin on opposite sides of the center of said pin, substantially as herein described.

59,497.—HAND STAMP.—George E. Woodbury, Cambridge, Mass.

I claim the combination and arrangement of the three type cylinders, D E F, with the shaft of the center one extending entirely through the plunger, and the shafts of the other two extending through opposite sides of the plunger, and each shaft provided with a hand wheel to turn and set it, substantially as described.

And in combination with the above claimed devices, I claim the movable ink ribbon, substantially as described.

59,498.—CARPENTER'S PLANE.—John Woodville, Cincinnati, Ohio.

I claim the hinged screw rod, H, in combination with the parts, D G, and provided with the flanged nut, I, wrench, J, and lock nut, K, when arranged with the jointing plane herein described, substantially as and for the purpose specified.

59,499.—CULTIVATOR.—Adam Young, Millstadt, Ill.

First, I claim the construction of the beams, C and C', and their combination with the sockets, a, or the handle, B', as the case may be, for the purpose of forming the connection between two corn plows.

Second, I claim the adjustable clamps, D, for the purpose of uniting the two parts of the beams, C and C', substantially as herein described and set forth.

Third, I claim the braces, E', and the staples, e, for the purpose of attaching the handle, E, to the other portions of the plow.

59,500.—BREECH-LOADING FIRE-ARM.—E. B. Stoddard, Worcester, Mass., administrator of C. C. Coleman, deceased.

I claim, First, The pusher, I, or its equivalent, arranged in combination with the hammer and swinging breech block, substantially as and for the purpose set forth.

Second, The swell, h, on the hammer, in combination with the pusher, I, and swinging breech block, C, constructed and operating substantially as and for the purpose specified.

59,501.—MACHINE FOR STRAIGHTENING, BREAKING, AND CLEANING FLAX, STRAW, ETC.—Stillman A. Clemens, Chicago, Ill., half assigned to Jas. J. Walworth.

First, In a machine for drawing and straightening tangled flax straw, used either alone or in combination with machinery for breaking or beaking and cleaning flax, I claim the employment of a toothed cylinder or toothed carrier combined with drawing or drawing and breaking rollers of any kind, and with or without a device or devices for impaling the said material upon said toothed cylinder or carrier, when said cylinder or carrier and drawing rollers are adapted to untangle, draw, and straighten said material, for the purposes set forth.

Second, The employment of a flax-impaling device or devices, substantially such as described, adapted to give impalement to the stalks of tangled flax, substantially as described, upon and between the teeth of a toothed cylinder, or its equivalent, or below the teeth points to or near their base, when such toothed cylinder is so combined with drawing rollers or fluted drawing and breaking rollers, as to convey or present the said impaled material to the action of said rollers in the said condition of impalement, for the purposes set forth.

Third, The cylinder, d, and rollers, g, combined with the adjacent pair of fluted rollers, h h, substantially as described and for the purposes set forth.

Fourth, The cylinder, d, and roller, g, combined with a series of pairs of fluted rollers, h h h h, substantially as described and for the purposes set forth.

Fifth, The combination of cylinder, d, and roller, g, with drawing rollers either fluted or plain, in combination with one or more pairs of fluted rollers for breaking flax, substantially as described and for the purposes set forth.

Sixth, The rollers, j j, in connection with fluted breaking rollers, h h, of one or more pairs, the whole operating substantially as described and for the purposes set forth.

Seventh, The combination of the cylinder, d, and roller, g, with drawing and breaking rollers and the rollers, j j, substantially as described and for the purposes set forth.

Eighth, The combination of cylinder, d, and roller, g, with drawing and breaking rollers and the flax-cleaning cylinder, l, substantially as described and for the purposes set forth.

Ninth, The combination of the cylinder, d, and roller, g, or any of the described flax-impaling devices, with drawing and breaking roller and the rollers, j j, and the flax-cleaning cylinder, l, substantially as described and for the purposes set forth.

Tenth, The toothed cylinder, d, combined with the adjacent pair of fluted rollers, h h, substantially as described and for the purposes set forth.

Eleventh, The cylinder, d, connected with drawing rollers, either fluted or plain, in combination with fluted rollers for breaking flax, substantially as described and for the purposes set forth.

Twelfth, The combination of cylinder, d, with drawing and breaking rollers and the rollers, j j, substantially as described and for the purposes set forth.

Thirteenth, The combination of cylinder, d, and drawing and breaking rollers, and the flax-cleaning cylinder, l, substantially as described and for the purpose set forth.

Fourteenth, The combination of cylinder, d, with drawing and breaking rollers and rollers, j j, with the cleaning cylinder, l, substantially as described and for the purposes set forth.

Fifteenth, The combination of the fluted rollers, h h, of one or more pairs of rollers, j j, the breast, k, and cleaning cylinder, l, when the whole operate together substantially as described and for the purposes set forth.

Sixteenth, The cylinder, l, combined with cylinder, y, and rollers, b' b', substantially as described and for the purposes set forth.

Seventeenth, The rollers, b' b', in connection with the chute bottom, u, and cylinder, g', substantially as described and for the purposes set forth.

Eighteenth, The combination of gill cylinder, y, rollers, b' b', and the cleaning cylinder.

Nineteenth, The combination of the toothed cylinder, d, top roller, g', drawing rollers, h h h h, rollers, j j, breast, k, cleaning cylinder, l, concave, s, chute bottom, u, gill cylinder, y, drawing rollers, b' b', breast, c', cleaning cylinder, g', concave, d', and deflecting board, l', all substantially as described and for the purpose set forth.

59,502.—MACHINE FOR STRAIGHTENING AND THRASHING TANGLED FLAX.—Stillman A. Clemens, Chicago, Ill., half assigned to James J. Walworth, Boston, Mass.

First, In a machine for thrashing or for thrashing and winnowing and screening the seeds of flax, or other seed-bearing plants, I claim the combination therewith of a drawing and straightening feed device, consisting of a toothed feed cylinder, adapted for impaling of the plants upon its teeth, with or without a device or devices for impaling said material upon said cylinder teeth, and with drawing rollers which draw and straighten said impaled material, and also crush the seed balls, and deliver the material to said thrashing machinery, substantially as described and for the purposes set forth.

Second, The combination of toothed cylinder, d, top roller, e, hinged cover, f, shell, g, drawing rollers, h h, table, i, cylinder, k, breast, l, concave, m, chute bottom, q, chute cover and deflecting board, t, chute sides, v v, sieve shoe, w, levers, z z, cams, q' o', fan blower, e', and trunk, f', substantially as described and for the purposes set forth.

Third, The combination of the pressure crushing rollers, h' h'', with the described machine, substantially as described and for the purposes set forth.

59,503.—MACHINE FOR BREAKING AND CLEANING FLAX.—Stillman A. Clemens, Chicago, Ill., half assigned to James J. Walworth, Boston, Mass.

I claim, First, The toothed cylinder, D, with long and short teeth, substantially as described and for the purposes set forth

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Second, The top roller, E, with indentated annular rings, d d, substantially as described and for the purposes set forth.
Third, The cylinder teeth, e e and k k, substantially as described and for the purposes set forth.
Fourth, The picker teeth, v v, substantially as described and for the purposes set forth.
Fifth, The cylinder concave, O, substantially as described and for the purposes set forth.
Sixth, The hinged cover, e'', combined with the cylinder, D, substantially as described and for the purposes set forth.
Seventh, The combination of toothed cylinder, D, top roller, E, hinged cover, e'', fluted rollers, F F' F'' F''', plain rollers, G G', cylinder, H, concave, I, chute bottom, K, shell roller, L, cylinder, M, breast, N, concave, O, chute bottom, Q, shell roller, R, cylinder, S, breast, T, concave, U, grate chute bottom, V, and chute cover and deflecting board, W, all substantially as described and for the purposes set forth.

59,504.—VALVE GEAR.—W. P. Corey (assignor to himself and D. P. Corey), Amsterdam, N. Y.

I claim the arrangement of the link, a, supporting pin, c, rod, i, and sliding block, k, arm, d, rock shaft, e, and the eccentric, f, relatively to each other, and with the valve, substantially in the manner and for the purpose herein represented and described.

59,505.—SASH HOLDER OR FASTENING.—E. L. Ferguson (assignor to himself and Charles B. Clark), Buffalo, N. Y.

I claim the friction roller, H, and loosely pivoted arm, J, in combination with the inclined track, g, and slot, f, of the plate, D, or its equivalent, and sash, A, arranged and operating substantially as set forth.
I also claim in combination with the above-described device the recess, n, and pin, c, operating subsiantially in the manner and for the purpose specified.

59,506.—SNAP HOOK.—E. B. Forbush and Josiah Letchworth (assignors to Pratt and Letchworth), Buffalo, N. Y.

We claim a snap hook having a longitudinal mortise, C, for receiving, holding and protecting its spring, B, when constructed substantially as described.

59,507.—ROLLER FOR FINISHING PHOTOGRAPHS.—W. J. Gordon, Philadelphia, Pa., assignor to John Hawworth, Pittsburgh, Pa.

I claim the mode of communicating heat to the cylinders or rollers of photographic or other presses by means of the application of heat to a thin metallic plate or heating box which is placed in close proximity to said rollers or cylinders as described in the accompanying drawing, or any other substantially the same.

59,508.—CONSTRUCTION OF CARRIAGE SEATS.—Benjamin Hurlburt, Milford, Conn., assignor to L. H. Holt, Hartford, Conn.

I claim a carriage seat in which the back and ends with rounded corners are formed from a single piece and in continuous grain of the wood, substantially in the manner described.
I also claim the base, C, formed in continuous grain as herein set forth.

59,509.—APPARATUS FOR SEPARATING METAL FROM ORES.—Stephen R. Krom (assignor to Louis F. Therasson, John A. Bryan, James M. Blackwell, and Apollos R. Wetmore), New York City.

First, I claim operating the feed valve, G, by means of the double links, J J', and its connections, substantially as and for the purpose herein specified.
Second, I claim opening and closing the joints between the fixed ring, a, and the upper face of the traveling ring, C, substantially as and for the purpose herein specified.
Third, I claim the sharp edge of the ring, C, when arranged and operated substantially as and for the purpose herein specified.
Fourth, I claim varying the depth of the stratum retained on the perforated bed, D, by the employment of the movable rings, C2, arranged relatively to the bed, D, and to the shoulder, substantially as and for the purpose herein specified.
Fifth, I claim mounting the bellows, G', in close proximity to the bed, D, substantially as and for the purpose herein specified.
Sixth, I claim the carriage, B, and crank, M, in combination with the bed, D, and ring, C, and with a suitable intermittent suction device, substantially as and for the purpose herein specified.

59,510.—APPARATUS FOR SEPARATING METAL FROM ORES.—Stephen R. Krom (assignor to Louis F. Therasson, John A. Bryan, James M. Blackwell, and Apollos R. Wetmore), New York City.

First, I claim producing a variable aperture through which the blast produced by the bellows may be discharged so as to reduce the action through the sieve, D, as required, substantially in the manner and for the purpose herein set forth.
Second, I claim contracting a portion, A3, of the casing between the bed, D, and the bellows, E, substantially as and for the purpose herein specified.
Third, I claim the inclined rods, F1 F2, cranks, G1, G2, and connecting gear, G, in combination with a bellows, and adapted to be used for separating ores and analogous uses, substantially as herein specified.
Fourth, I claim mounting the supporting links, B B, on centers one side and not under the trunnions, c, of the ring, C, substantially as and for the purpose herein specified.
Fifth, I claim the rotating pan or vessel, R, arranged to operate in combination with the scraper, a, and the bed, D, and ring, C, substantially in the manner and for the purpose herein set forth.

59,511.—SNAP HOOK.—Josiah Letchworth (assignor to Pratt and Letchworth), Buffalo N. Y.

I claim the combination of the longitudinal mortise, A, with the lips, b, made below the mortise, so as to show a recess or depression, g, or with the rivet, d, for the purpose and substantially and described.

59,512.—COTTON TIE.—John F. Milligan (assignor to Joseph W. Branch and Joseph Crooks), St. Louis, Mo.

I claim a tie plate, B, provided with the pointed retaining projection or stop, b, when combined with an oblique slot, c, to receive and secure the free end of the hoop, all substantially as and for the purposes herein described.

59,513.—TOOL FOR OPENING CANS.—Eben T. Orne (assignor to himself and John P. Hart), Chicago, Ill.

I claim the adjustable cutter, C, when constructed to operate against the stationary cutter, A, substantially as and for the purpose set forth.

59,514.—FEED ROLLER FOR PLANING MACHINES.—Frank J. Plummer (assignor to R. Ball & Co.), Worcester, Mass.

I claim, First, Adjusting the top feed roll of a planing machine by means of screw rods respectively hinged to the journal boxes of such roll and working in internal screw cylinders so attached to the gear wheels as that, while revolving with the gear wheels, they shall have a sliding or vertical motion independent therefrom, substantially as described and for the purposes set forth.
Second, I claim, in combination with the internal screw cylinders attached to the gear wheels, as described, and receiving the screw rods hinged to the feed roll of the lever weights, substantially as and for the purposes set forth.

59,515.—PLOW.—John N. Pond (assignor to A. W. Holt and John L. White), Wakefield, Va.

I claim the rectangular cutter, A, when arranged, combined, and operated by adjustable levers, B and C, to be attached to any ordinary plow, as herein described and for the purposes set forth.

59,516.—PORTABLE CUPBOARD.—James L. Prescott, North Berwick, Me., assignor to himself and S. R. Gowell, Portland, Me.

I claim the combination of the detachable frame, A D, removable shelves, C, bail, E, handle, F, and netting or covering, O, all arranged in the manner and for the purpose specified.

59,517.—CAR COUPLING.—Chauncey Spear, Chapinsville, N. Y., assignor to himself, Holmes C. Lucas, Canandaigua, N. Y., and Walter Marks, Hopewell, N. Y.

I claim the combination of the pin, D, with an extended head or plate, F, and the notched frame, E, operating as described to temporarily hold the pin and release it by the concussion of the cars.

59,518.—LAMP BURNER.—Aaron C. Vaughan (assignor to himself and R. W. Park), Philadelphia, Pa.

I claim, First, The combination of the tubular wick, with the perforated casing, E, and flange, e, the whole being arranged substantially as and for the purpose described.
Second, The wick tubes, B and C, with their tubular wick in combination with the flange, e, rendered adjustable to and from the top of the wick tubes, substantially as described.
Third, The detachable continuation, d, of the wick tube, B, for the purpose described.

59,519.—STEAM PUMP.—Leon Carricaburn, Havana, Cuba.

I claim the valves, F and F', furnished with toes or projections extending through the parts of the cylinder, so as to cause the valves to be actuated by the piston, substantially as described.

59,520.—PHOTOGRAPHIC PROCESS.—Cyprien Marie Essie Du Motay and Charles Raphael Marechal, Metz, France.

We claim the new process for the production of photographic images, capable of being inked with fatty inks, substantially as herein described.

59,521.—SASH FASTENING.—John K. Farnworth, Alderley Edge, England.

I claim the lever handle, j j', link, s, and spring catches, q, in combination with the racks, g, in the edges of the movable sash, d as and for the purpose set forth.

59,522.—TYPOGRAPHY.—Pierre Flamm, Phlin, France.

I claim, First, The combination of the mechanism shown and described for impressing the type in the mold with those which regulate the transverse movement of such mold so that they may be actuated or operated by the same lever or equivalent means, substantially as shown and set forth.
Second, I claim the combination of the mold and ratchet frame, E, with the pawl which engages with such ratchet, mounted on a rock shaft as described, and operated substantially in the manner and for the purposes herein shown and set forth.

59,523.—RING FOR RING AND TRAVELER SPINNING MACHINES.—James Higgins, Manchester, England.

I claim as a new article of manufacture the seamless ring herein described for ring and traveler spinning cut from a tube or rod and finished by swaging or turning, all as specified.

59,524.—VALVE FOR STEAM HAMMERS.—David Joy, Middlesbrough, England.

First, I claim, in hammers where steam or other fluid which actuates the hammer, is used to move the valve without the use of levers, cams, tappets or links, regulating the action of the valve so moved by the early or late opening of the port or hole admitting the pressure upon it by means of the slide, O, substantially as described.
Second, Regulating the force of the blow of the hammer by means of the holes, m*, in the cylinder and valve chest and the channel which connects them, substantially as described.

59,525.—CARRIAGE.—G. H. and E. Morgan, Edgware Road, England.

First, We claim the placing the head joints, b, or their equivalents, inside of the head of a carriage and hid by the lining, substantially as herein shown and described.
Second, We claim the employment of mechanism connected to the head joints, b, or their equivalents of a carriage, in such manner that the head of a carriage, whether in one or more parts, may be capable of being raised or lowered by a person on the driver's seat or other suitable part of a carriage acting upon a lever or screw or other equivalent means, in manner substantially as herein shown and described.

59,526.—CARRIAGE.—G. H. and E. Morgan, Edgware Road, England.

First, We claim the application of a head or cover to a wagonette or other similar vehicle, capable of being raised or lowered as desired, substantially as herein shown and described.
Second, We claim the application to wagonettes or other similar carriages of means or apparatus for raising and lowering the head or cover thereof, which apparatus is capable of being put in motion from the driver's or other suitable part of the carriage, substantially as herein shown and described.
Third, We claim the mode of applying the mechanism for raising and lowering the heads or covers of wagonettes and other similar vehicles between the cover and the lining of the carriage, substantially as herein shown and described.
Fourth, We claim the mode of applying side lights, p, to the heads or covers of wagonettes constructed according to our invention in such manner that they shall be capable of rising and falling with the heads or covers thereof and be guided in their motion in suitable guides, substantially as herein shown and described.
Fifth, We claim the mode of giving motion to the upper parts a' a', of the heads or cover of landaus and other similar carriages, substantially as herein shown and described.
Sixth, We claim the mode of constructing to connecting rods, c c and e e, when applied to landaus or other carriages in two parts connected together so as to afford facility for adjustment, substantially as herein shown and described
Seventh, We claim the mode of connecting together the connecting rods, g g, so as to form a rigid frame by means of rods or bars provided with screws at their ends and fixed to the connecting rods by lock nuts, substantially as and for the purpose herein shown and described.
Eighth, We claim the mode of supporting and working the screw by which motion is given to the apparatus for raising and lowering the heads of carriages, substantially as herein shown and described.
Ninth, We claim the mode of communicating motion from the screw, k, to the connecting rods, g g, and of limiting the amount of motion in either direction of the nut, i, substantially as herein shown and described.

59,527.—CLOTHES DRYER.—Richard H. Oates, Toronto, C. W.

First, I claim the combination of the casing, A, post, B, rack, E, pinion, H, pawl, J, and cap, C, with the revolving cross arms, M, which carry the clothes line, all arranged and operating as herein set forth.
Second, In combination with the posts, A B, I claim the roof casting, C, to prevent the rain from beating in between the inner and outer posts, substantially as described.

59,528.—GRINDING MILL.—Emile Peugeot and J. B. B. C. Laurent, Paris, France.

We claim the gap, g, in the concave, F, substantially as and for the purpose set forth.

59,529.—REGULATING THE FLOW OF GASES IN APPARATUS FOR DIVING.—Benoist Rouguayrol, Paris, France.

I claim, First, The apparatus or regulator substantially as herein described, the same being composed of a compressed air reservoir, surmounted by an air chamber, the latter being provided with an elastic cover, in the center of which is placed a regulating rod which acts on the valve, separating the two chambers in such manner as to permit the air from the reservoir to pass in greater or less quantity into the air-chamber, according as the elastic cover of such chamber is subjected to more or less pressure.
Second, In the apparatus herein described, I claim the combination with the air reservoir, of two regulating chambers for producing a constant and regular flow or circulation, substantially as set forth.
Third, I claim the construction of the mouth closer and valve of expiration, substantially as and for the purposes herein shown and set forth.

59,530.—MANUFACTURE OF LEATHER CLOTH.—T. Story, Lancaster, and W. V. Wilson, East London, England.

We claim the application and use to and in the manufacture of what are known as American leather cloth goods, of coloring matters, of the nature hereinbefore described.

59,531.—PROCESS FOR THE RECOVERY AND PURIFICATION OF SULPHURIC ACID USED IN REFINING PETROLEUM, ETC.—Michael Barrett, Toronto, Canada West.

I claim the recovery, purification, and revivification of the sulphuric acid spent and deteriorated in the process of refining petroleum, coal, and shale oils, by means of oxygen gas in the nascent state, by whatever means developed or obtained.

59,532.—WASHING MACHINE.—George L. Witsil (assignor to himself and William Darman), Philadelphia, Pa.

I claim a washing machine, consisting of a revolving cubical box, A, with internal ribs, B, placed on each face of the cube, the middle one diagonal and the others parallel therewith, closed by a door, F', when constructed and arranged substantially as set forth.

59,533.—RAILROAD TICKET PRINTING PRESSES.—Walter H. Forbush, Buffalo, N. Y., assignor to Henry G. Leisenring, Philadelphia, Pa.

I claim, First, The combination of the wedge openers, I', or their equivalent, with the nippers, G', having an intermittent feed movement, constructed and operated substantially as described.
Second, The drawout fingers, L3, operating in connection with the wedge openers, to remove the sheets from the nippers, G', substantially as set forth.
Third, The grooved slides, O, attached to the platen, parallel to the face of the form, and carrying the inking roller or rollers over the form, in the manner and for the purpose substantially as described.
Fourth, The arrangement of the inking roller cams, N4, radius arms, N5, supported upon the vibrating lever, N2, and carrying the "form" inking rollers, N, combined with the grooved slides, O, and permanent bearers, O2, so that the inking rollers will reach the limit of their forward vibration at the same time the platen reaches the limit of its upward movement, and so that both platen and inking rollers change the direction of their movement at the same time, substantially as described.
Fifth, The fountain ink rollers, in combination with segments, P, which receive their motion from one of the cranks, D2, for the purpose and substantially as set forth.
Sixth, Attaching the platen to the cross head by the combined suspension bolts, C4, and impression screws, C6, in the manner and for the purpose set forth.
Seventh, The clamp bars, J1, and L4 (either or both), arranged and operating substantially as described and for the purpose specified.

REISSUES.

2,387.—WHIP-SOCKET FASTENING.—Edwin Chamberlain, Troy, N. Y. Patented August 23, 1864.

First, I claim a detachable and removable whip-socket fastening attached to the dash or other suitable parts of a land carriage or other vehicle, in the manner and for the purposes substantially as herein described and set forth.
Second, I also claim a whip-socket fastening having a clamp or holder, B B, for a whip socket combined with the jaws, A A, for receiving and griping a bar or rod in a covered dash or other part of a carriage or other vehicle, substantially as hercin described and set forth.

2,388.—MODE OF SUPPORTING REELS FOR HARVESTERS.—Robert T. Campbell, Washington, D. C., assignee of Thomas J. Stealy. Patented December 15, 1857.

First, I claim combining with a hinged platform which is free to conform to the undulations of the ground independently of the motions of the draft frame, or of the action of the transporting wheels, a toothed rake which will deliver the cut grain upon the ground in gavels, and a reel or gathering device which will press the standing grain toward the cutters, said rake and reel or gatherer being wholly supported upon the said platform, substantially as described.
Second, Combining with a hinged platform a toothed rake, and a reel or gatherer, which are wholly supported upon and move in harmony with said platform, an adjustable hinged connection which will allow of the vertical adjustment of the cutting apparatus to adapt the machine to different hights of cut required, substantially as described.
Third, Sustaining a toothed rake and a reel or gatherer wholly upon a platform which is supported at its inner end by a vertically-adjustable joint, and its outer end by a wheel or its equivalent, substantially as described.
Fourth, Suspending the hinged platform, which has a toothed rake mounted wholly upon it, from the main draft at a point in rear of the cutting apparatus, in such manner that this part of the platform can be adjusted vertically without changing the position of the forward adjustable hinge connection, substantially as described.
Fifth, The combination of hinged finger beam, a platform and an auxiliary adjustable suspending and sustaining flexible connection, in such manner that the finger beam and platform are firmly suspended at their inner ends and are free to conform at their outer ends to the undulations of the ground, independently of the main frame or of the axle of the supporting wheels, substantially as described.
Sixth, In combination with a vertically-adjustable hinge joint and hinge movement of the finger beam and cutter bar, and with the crank, d, for communicating motion to the cutters, I claim the employment of the universal joint, m, to connect the pitman, I, with the cutter bar, substantially as described, and the adjustable blocks, 1 and 2, for tightening the joint around the crank wrist, d, substantially as set forth.
Seventh, The combination of crank shaft, O, with adjustable bearings, a a, the pitman, Q, and the oscillating rake, S, substantially as described.
Eighth, Hanging the reel to the rake frame or platform, and adjusting said reel to different hights by means of braces, w w, or their equivalents, substantially as described.

2,389.—TRIP HAMMER.—Bennet Hotchkiss, New Haven, Conn., assignor through mesne assignments to himself. Patented June 14, 1859.

First, I claim, in combination with a hammer and an actuating mechanism having a definite reciprocation, the elastic spring or springs, whether of air or other material, interposed between the definite reciprocating mechanism and the hammer, substantially in the manner herein shown and described, so that the extent of motion given to the hammer and the force of its blow may be regulated by the speed of the actuating mechanism, substantially as set forth.
Second, I claim the reciprocating pneumatic cylinder, having a hole near its central portion, in combination with a piston rod and hammer, substantially as and for the purpose specified.
Third, I claim adjusting the space between the anvil and the hammer by mechanism, constructed and arranged substantially as specified, so as to accommodate different sized forgings, as set forth.

2,390.—SAFE.—Rufus S. Sanborn, Ripon, Wis. Patented July 17, 1866.

First, I claim the combination of two or more concentric cylinders or cases, B C D, whether in the form herein represented or otherwise, when each cylinder or case is separated from the next one to it within or without, in such a manner that air is allowed

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o circulate freely all around it both at its sides and ends, as and or the purpose represented.

Second, The combination of the water vessels F F, or their equivalents, when used with the cylinders or cases, B C D, arranged as specified, whereby steam from said vessels may be allowed to circulate freely around the sides and ends of the cases, substantially as and for the purpose herein specified.

Third, The arrangement of the inner box, E, for containing books and papers, with the cylinders, B C D, or their equivalents, in box form, and an outer case, A, substantially as and for the purpose herein set forth.

2,391.—HORSE HAY FORK.—J. S. Brown, Washington, D. C. Patented July 17, 1866. Reissued November 6, 1866.

I claim the employment of a movable bar or bars, D D, to cover and uncover fixed barbs or shoulders, C C, in combination with a divided shaft, A, to be opened in dovetail or inverted wedge form, and closed in connection with the uncovering and covering of the barbs or shoulders, substantially as and for the purposes herein specified.

2,392.—HORSE HAY FORK.—J. S. Brown, Washington, D. C. Patented July 17, 1866. Reissued November 6, 1866.

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PROPOSALS FOR IRON HEAD BLOCKS.—

Quartermaster General's Office, Washington, D. C., Oct. 31st, 1866.

1. Sealed Proposals will be received at the Office of the Quartermaster General, Washington, D. C., until November 30th, 1866, for furnishing Cast-iron Head Blocks for National Cemeteries, delivered in quantities about as follows, viz:—At

		Head Blocks
Boston, Mass.	from 300 to	500 "
Providence, R. I.	from 300 to	500 "
New Haven, Conn.	from 300 to	500 "
New York City, N. Y.	from 4,000 to	6,000 "
Philadelphia, Pa.	from 3,600 to	3,500 "
Pittsburgh, "	from 100 to	200 "
Frederick, Md.	from 1,000 to	1 500 "
Cumberland, "	from 500 to	600 "
Baltimore, "	from 1,500 to	2,000 "
Annapolis, "	from 2,500 to	2,700 "
Point Lookout, "	from 2,500 to	4,000 "
Antietam, "	from 4,000 to	7,500 "
Wheeling, W. Va.	from 100 to	200 "
Charleston (Kanawha C. H.)	from 200 to	500 "
Washington, D. C.	from 20,000 to	25,000 "
Alexandria, Va.	from 3 000 to	4,000 "
Fredericksburg, "	from 12,000 to	16,000 "
Winchester, "	from 5,000 to	8,000 "
Harper's Ferry, "	from 1,000 to	1.500 "
Richmond, "	from 8,000 to	11.000 "
Hampton, "	from 3,000 to	4,000 "
Norfolk, "	from 700 to	1,500 "
City Point or Petersburg, "	from 15,000 to	20,000 "
Newbern, N. C.	from 1,000 to	1,500 "
Wilmington, "	from 2,500 to	3,000 "
Salisbury, "	from 500 to	600 "
Goldsborough, "	from 1,500 to	2,000 "
Charleston, S. C.	from 500 to	1,000 "
Florence, "	from 500 to	3.500 "
Hilton Head, "	from 2,000 to	2,500 "
Beaufort, "	from 1,000 to	1,500 "
Savannah, Ga.	from 1,000 to	1,500 "
Marietta, "	from 4,000 to	7,000 "
Andersonville, "	from 12,000 to	13,000 "
Millen, "	from 1,500 to	2,000 "
Mobile, Ala.	from 700 to	1,000 "
Selma or Montgomery, Ala.	from 2,000 to	3,000 "
Barrancas, Fla.	from 500 to	1,000 "
New Orleans, La.	from 3,000 to	4,000 "
Baton Rouge, "	from 2,000 to	2,500 "
Port Hudson, "	from 500 to	600 "
Brownsville, Texas	from 500 to	600 "
Branzos Santiago "	from 200 to	300 "
Natchez, Miss.	from 1,200 to	2,000 "
Vicksburg, "	from 15,000 to	25,000 "
Corinth, "	from 4,000 to	6,500 "
Memphis, Tenn.	from 8,000 to	12,000 "
Fort Donelson, "	from 2,000 to	3,000 "
Nashville, "	from 15,000 to	20,000 "
Pittsburg Landing "	from 3,000 to	4,500 "
Stone River, "	from 4,000 to	5,000 "
Chattanooga, "	from 8,000 to	10,000 "
Knoxville, "	from 2,500 to	3,000 "
Columbia, "	from 1,200 to	1,500 "
Louisville, Ky.	from 4,000 to	5,000 "
Camp Nelson, "	from 2,000 to	2 500 "
Bowling Green, "	from 1,200 to	1,500 "
Lexington, "	from 1,000 to	1,200 "
Cairo, Ill.	from 6,000 to	8 000 "
Chicago, "	from 1 000 to	4,500 "
Springfield, "	from 600 to	1,200 "
Quincy, "	from 200 to	300 "
Rock Island "	from 1,200 to	2,000 "
Jeffersonville, Ind.	from 800 to	1,000 "
Indianapolis, "	from 1,200 to	3,000 "
Jackson, Mich.	from 100 to	200 "
Cincinnati, Ohio.	from 700 to	1,000 "
Columbus, "	from 300 to	2,400 "
Camp Dennison, "	from 300 to	400 "
Johnson's Island, "	from 200 to	300 "
St. Louis, Mo.	from 4,000 to	5,000 "
Jefferson Barracks, "	from 3,000 to	4,000 "
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Davenport, Iowa.	from 100 to	200 "
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Little Rock, Ark.	from 2,000 to	2,500 "
Fort Smith, "	from 1,200 to	1,500 "
Omaha, N. T.	from 1,200 to	2,000 "
San Francisco, Cal.	from 200 to	1,000 "

2. The head blocks to be made in accordance with the specifications, and to conform strictly to the samples, both of which may be seen at the Offices of the Depot or Chief Quartermasters at Boston, New York, Philadelphia, Pittsburgh, Baltimore, Washington, Fortress Monroe, Richmond, Raleigh, Newbern, Fayetteville, Charleston, Savannah, Augusta (Ga.), Tallahassee, Mobile, New Orleans, Galveston, Vicksburg, Memphis, Nashville, Chattanooga, Murfreesboro', Louisville, Cairo, Chicago, Jefferson ille, Columbus (Ohio), Cincinnati, Detroit, St. Louis, Fort Leavenworth, Omaha, Little Rock, and San Francisco. (Bids for San Francisco will be received until December 31, 1866.)

3. They will be about nine (9) inches high, from ten (10) to twelve (12) inches long, and from three and a half (3½) to four and a half (4½) inches wide, with a flange around the bottom. They will be hollow, and will have a number cast on the back, and an inscription of the name, rank, regiment, arm, company, or corps, and date of death of the deceased, cast in raised letters on the top. They must be cast of good stove-plate iron, weight not less than twenty (20) lbs. each, and be coated thoroughly by dipping in melted zinc.

4. Separate bids are invited for delivery at each place; and in case the same parties offer to supply more than one locality, it should be stated at what reduced price the articles would be furnished in the increased number.

5. Each bid must be accompanied by a good and sufficient guarantee of at least two responsible parties that the contract, if awarded, will be faithfully and promptly executed. (The responsibility of the guarantors must be shown by the official certificate of the clerk of the nearest District Court, or of the United States District Attorney.)

6. The Government reserves to itself the right to reject all bids, if unsatisfactory; and to delay the award not later than the first of January, 1867; and also, in some instances, to change the points of delivery of a portion of the head blocks, in which case a reasonable allowance for increased, or deduction for diminished transportation will be made.

7. The time of delivery to be subject to future arrangement, sufficient time being allowed after the lists of names are furnished to the contractor.

8. The articles must conform rigidly to the sample, and will be subject to such inspection, at the point of delivery, as the Chief of the Bureau may direct.

9. The full name and post office address of the bidder should appear in the proposal.

10. Proposals should be plainly endorsed "Proposals for Iron Head Blocks," and be addressed "To the Quartermaster General U. S. A., Washington, D. C."

M. C. MEIGS, Quartermaster General, 21 3] Brevet Major General, U. S. A.

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The accompanying engravings represent an elegant article of parlor or nursery furniture, which can be used as a rocking chair for adults, or an inclosed cradle for infants. In either form it is perfect and sightly.

Fig. 1 represents the chair, the two arms of which are double, hinged at the front, as seen at A, and secured by a spring catch to the back. (See B, Fig. 2). The seat also is double and hinged, and when unfolded makes the bottom of the cradle. The back is in two parts, the upper one secured to the lower by a thumb-screw passing through both, and the two swing catches, C, Fig. 1. The frame of which the rockers form a part, is secured to the lower seat by a pivot in a slot, so that it can be swung around at right angles to its ordinary position, or can be used to make the cradle one swinging laterally, being held firmly in either position by means of a spring bolt under the seat. The cradle can be made to rock either way.

The operation of transformation can be readily and quickly performed. The seat is turned over, the frame and rockers swung around; then the back is removed and secured to the seat proper, at D, Fig. 2. The arms are swung open and locked to the movable back, and the transformation is completed.

This improvement was patented through the Scientific American Patent Agency July 3, 1866, by Alois Berny, of Williamsburgh, N. Y., whom address for further particulars at No. 30 Wyckoff st. State and county rights for sale.

Fig. 1.

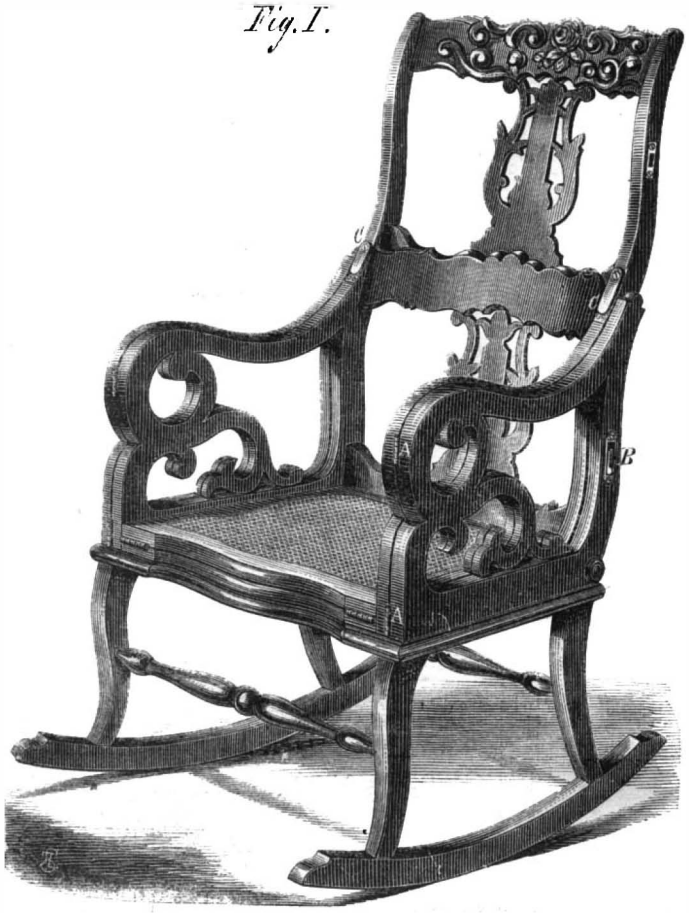
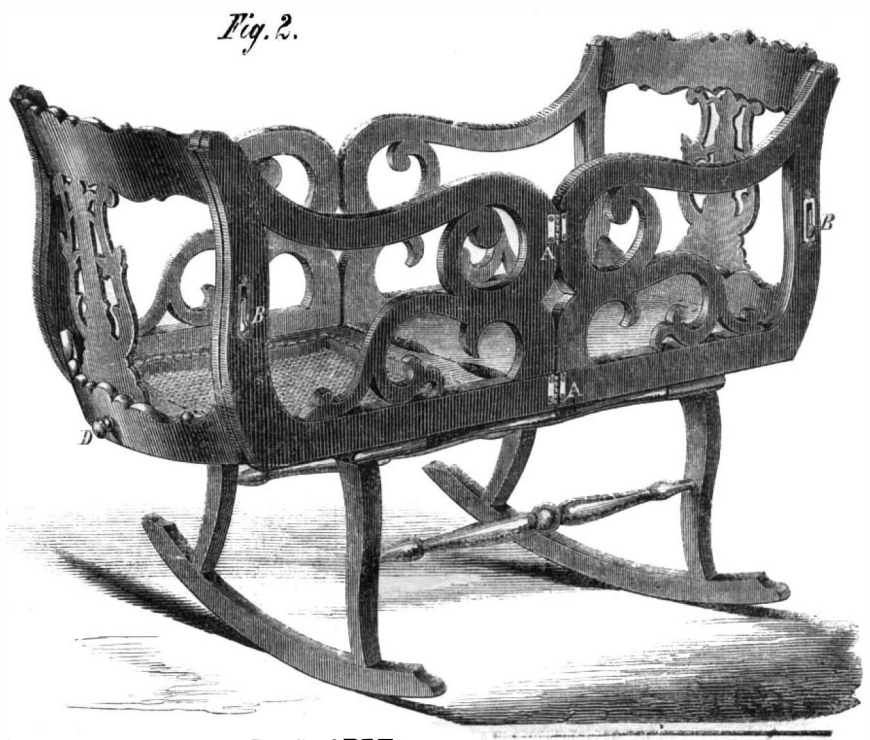


Fig. 2.



BERNY'S COMBINATION CHAIR AND CRADLE.

A Very Singular Explosion.

The *Alta* gives an account of a very singular explosion that took place recently in San Francisco, on board the sloop *Sycamore*. The explosion of an ordinary brass ship's lamp, with such force as to shatter the cabin into kindling wood, kill the bearer of the lamps and even drive pieces of the metal deep into the deck, accompanied by a noise like the report of a cannon, was something not easily to be explained on any theory based on the supposition that the contents of the lamp were simply coal oil, or even camphene or benzine. On investigation of the circumstances, Coroner Harris has probably hit upon facts which will explain the whole matter. The story is a curious one. The men on board the sloop say that they went ashore at Red Rock some weeks since, and while at the Manganese mines, there located, obtained some fluid which they supposed to be oil. How they obtained it does not yet appear, but they state that some of it was placed in the coal-oil can, kept on board for filling the lamps. Shortly thereafter some one took the can to oil the axle of the truck used for hauling freight on board the vessel, and on the truck being used an explosion followed. It was then ascertained to the satisfaction of the men that the supposed oil was nitro-glycerin, which had been taken to Red Rock to be used in blasting in the mine. They thereupon turned the dangerous fluid overboard, and coming to this port again had the can filled with coal oil at a drug store. On examination of the body of Chas. Hunt, the Coroner discovered that the hole in the abdomen, made by the entry of a piece of the lamp, was of small size, and appeared as if made by a sharp instrument. This appearance deceived Dr. Hastings, at the United States Marine Hospital, and caused him to suspect that a murder or homicide had been committed. On opening the body it was found that the brass wick tubes of the lamp only had penetrated the abdomen. They had passed through the lower part of the stomach, ranging upward and backward, and entered the liver, where a second explosion had taken place. The tubes were torn into minute shreds by this explosion, and the fragments flying in all directions cut the lower part of the liver into pieces hardly larger than a kernel of corn. The theory suggested by these facts is, that enough of the nitro-glycerin remained sticking to the sides of the can, when it was refilled with coal oil, to produce the explosion. This floated on the surface of the coal oil or mingled with it, and found its way into the lamp, where it, in some manner, through friction in screwing down the tubes, a sudden jar, or heat from the burning wick, exploded with the terrible force and fatal result stated. Coroner Harris is determined to have the mystery fully cleared up, if possible, and has accordingly submitted the contents of the can to a chemist, who will analyze them and report on their character at the inquest.

MR. ROBERT WILLIAMS, formerly a Connecticut railway engineer, but for the last twenty-three years a resident of Russia, is the manager of a mammoth repair shop and railroad car works, built on the outskirts of Moscow. This vast establishment covers an area of more than sixty acres, and was constructed at an expense of not less than one million rubles (seven hundred and fifty thousand dollars). When additional extensions, now under way, are completed, over two thousand workmen will be employed. The establishment is the largest shop in Russia, and enjoys the patronage of the Imperial Government to the fullest extent.

Apparent Position of the Sun.

In reply to the query of A. S., of Sauquoit, N. Y., published in our issue of Oct. 13th, we have received six replies, from New York, Illinois, Ohio, Indiana, and Massachusetts. We select the briefest and simplest solution, although each one is correct: "The sun rises and sets north of a line due east and west from March 21st to Sept. 23d, because the earth's axis inclines toward its orbit. In other words, the north pole leans toward the sun on June 21st, when we see it furthest north. From Sept. 23d to March 21st the north pole leans from the sun, and directly from it on Dec. 22d, when we see it furthest south. From this it follows that were the sun only one-half of a degree north of the equator, and the observer at latitude 80 north, he would look north of east to see the sun at sunrise, and north of west at sunset. When the earth's axis is at right angles with the sun we see the sun due east at sunrise and due west at sunset, which occurs but twice a year, March 21st and Sept. 23d."

INVENTORS, MANUFACTURERS

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